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THE

DISEASES OF CHILDREN.

A HANDBOOK FOR PRACTITIONERS AND STUDENTS.

BY

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LONDON:
BAILLIÈRE, TINDALL & COX,
20, KING WILLIAM STREET, STRAND.
1884.

F. C. Shattuck M.D.
12/13/84.

TO THE

GOVERNORS AND STAFF

OF THE

NORTH-EASTERN HOSPITAL FOR CHILDREN

This Book is Dedicated

WITH FEELINGS OF PROFOUND ADMIRATION FOR THEIR
DISINTERESTED EFFORTS TO AMELIORATE THE
CONDITION OF THE JUVENILE SICK.

PREFACE.

THE production of a work specially devoted to the diseases of children can hardly now be regarded as evidence of its author's desire to push beyond its legitimate limits the departmental study of medicine. Formerly this construction would almost necessarily have been placed on such action, and it would have been asserted that the ailments of children were nothing distinct from those of adults, nor demanded from the practitioner any particular knowledge to insure successful treatment. This theory, fortunately, is already entitled to the tender handling that curious and exploded errors which possess a certain degree of historical interest are wont to encounter; and though it would be rash, perhaps, to declare that no representatives of the school which formulated the mistaken belief remain to propagate the mistakes it originated, still their number is in smallest proportion to those who accept the teachings of modern experience and research, and willingly assign to the diseases of children that position of primary importance which every skilled physician familiar with their varied phases unquestionably accords them.

Opponents of "Specialism" are wont to utter sweeping condemnations of the impropriety they conceive to surround the practice of every consultant who professes competence to give reliable opinions on only a single group of diseases.

They declare that whoever voluntarily thus narrows the field of his labours must be deficient in the material characteristics of a good physician; they do not apparently recognise that there is a common science of medicine, the comprehension of which *alone* enables the student to become a *general* practitioner, and that none but those who are at the outset of their career competent in this direction can ever aspire to pursue a successful course as specialists. It was a natural consequence of limited knowledge, that every man should have been deemed capable of attaining perfection in all the branches of medicine; but observation and research have so immeasurably extended the area covered by the profession in later years that almost universal agreement now exists on the question of specialism. The best proof indeed that this is so will be found in the regulations of examining bodies, which, while reflecting many vicious principles, do at the same time serve to show in what direction the force of opinion is exerted. It is now the rule rather than the exception, even at examinations for diplomas, for the candidate to be called on to answer questions relating to special groups of diseases, many of which, twenty years ago, would have been held to be inappropriately addressed by an examiner to those who came before him officially. Whether or not the result of this change is of a beneficial character must of course be decided according to the view taken of what constitutes competent professional knowledge: but there can be no possibility of doubt that the gradual introduction of special studies into the curriculum has effected, and will continue to effect, increasing extension of knowledge, by multiplying the numbers who share, and are thereby fitted to add to, existing stores. From the point of view of the student, who, by a process of endless separation and division, is burdened with a growing list of sciences where one formerly embraced the whole, there is, of course, some-

thing to be said; but on the other hand, each year brings to the ranks of medical students young men more and more amply equipped to enter on the arduous labours that confront them, and more able than their predecessors to grapple with the heavier task of acquiring information. This is, in truth, apparent in many ways, and it should have the effect of stilling the objections of such as pretend that too much is required from coming practitioners.

These remarks do not by any means imply a defence of the particular study to which this work serves as an introduction. So far as the diseases of children at least are concerned, no excuse for a manual devoted to their description can be necessary, for no class of diseases is either so likely to be at once and frequently encountered by the young medical man, or so strikingly calculated to imperil his reputation at a critical period in his career. The economy of nature prescribes babies as its most constant and abundant blessing; and equal certainty may be felt that childhood will be associated with disease through lengthened ages to come, as it has in the years that have passed. Their very profusion is, in a manner, the worst embarrassment which infants produce in inexperienced doctors; for a certain considerable proportion of each beginner's patients will necessarily come within the category, and accordingly as he is or is not successful in his treatment of them will his reputation for skill, or the reverse, be recorded by anxious parents. And yet with a full knowledge of this, hardly one student of medicine out of every hundred who qualify as practitioners is in a position, on leaving his hospital, to prescribe without hesitation the amount and nature of substances suitable for administration to children suffering from the most ordinary illnesses of infancy. Further, too, they fail to appreciate the importance of the slight ailments met with in this class of patients, and are oftentimes misled into the commission

of grave diagnostic errors through this very fact, combined with a tendency, bred of a familiarity with disease in adults, to associate the same consequences with apparently similar manifestations in the two subjects. This, it must be admitted, is a fault of the schools, rather than of the pupil, who is rarely, indeed, impressed with the need of distinguishing physiological factors as potent in the production of physical derangements; and still less influenced to differentiate the processes that mark the infant organism as distinct from the fully grown.

In the work here presented to the reader, an honest attempt is made to render the task of rightly understanding the *facies* of diseases as met with in children; and scrupulous care has been exercised in the descriptions of various characteristic conditions of ill-health, so that the book may be a faithful guide to the learner whose desire it is to acquaint himself with the distinctive features of infantile ailments. It is necessarily impossible for the author to claim originality in anything other than the effort he has made to avoid the common error illustrated in books having similar titles to the present. These, almost without exception, tacitly assume, with the poet, that "all men are but children still," and carrying the principle enunciated in the quotation to somewhat extreme limits, they lead their readers to the conclusion that diseases incident to infancy are to be regularly exploited in the aged puerility of the period extending between the twelfth and twentieth years of life. That this should be so is unfortunate in many ways; but it affords additional evidence of the truth of what has been already stated above in relation to the confusion generally existing on the subject of diseases of children, especially among younger practitioners. The loose methods of the schools are repeated in the text-books written for examination purposes, and small heed is given to the great truth that students of medicine in the present

will by-and-by be called on to practise the methods they have learned *in statu pupillari*. Then it is that vexation is aroused by the existence of doubt respecting the most appropriate medicines to be adopted, when immediate action is called for in a case of illness occurring in a recently born infant. Except in hospitals specially devoted to children, the very young are rarely seen, it is true, except in the receiving-room or out-patient departments; and too frequently, it is to be feared, the embarrassment the situation creates is warded off by resort to remedies whose principal merit resides in their harmlessness. Anything approaching to rational treatment is certainly the exception rather than the rule in such cases; but the time is close at hand when easy tolerance of this unscientific system must cease to be endured, in deference to the force of opinion which is setting in this direction.

It may not be presumptuous on the part of the author to hope that he has succeeded in producing an introduction to the diseases of children which will be of service to students generally, and which, while not exceeding moderate limits, does yet cover the ground indicated by its title, without confusing the reader by descriptions of ailments which do not usually affect the class of patients under consideration.

It is a duty and a pleasure to the author to record in this place the deep sense he entertains of the valuable assistance he has received from his father, Dr. Robert Hunter Semple, in the revision of the work during its passage through the press, and also from several friends who have manifested interest in its progress; especially would he mention the names of Norman Dalton, M.D., London; J. A. West, M.R.C.S.E., Resident Medical Officer to the North Eastern Hospital for Children; E. Tull Trevor, M.R.C.S.E., Registrar to the same hospital; and Charles

H. Wade, B.A., Oxon., of the London Hospital; his indebtedness to the last-named gentleman, covering not only the original suggestion of the book, but many hints of a practically useful kind as regards its form and limits, and literary character.

8, Torrington Square, W.C.
November, 1883.

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DISEASES OF CHILDREN.

GENERAL CONSIDERATIONS.

The state of childhood may be considered to consist of two periods:—

1. From birth until the twelfth month.

2. From the termination of the first year until the end of the eighth year.

Usually about the tenth or twelfth month the child, by acquiring teeth, is enabled to take nourishment other than the mother's milk, the stomach and bowels at this epoch advantageously receiving various kinds of food which would have previously induced derangement of the digestive functions; the countenance acquires expression, the eye intelligence, and the limbs become firm.

In the first period the child is susceptible to diseases and dangers, the liability to which diminishes at the beginning of the second period. At the end of the eighth year the term "child" should be abandoned, since about this time the influence of sex is usually apparent, and therefore it would be more reasonable to adopt the expression "boy" or "girl."

The infant at birth possesses nearly the same organs as the adult, but these differ in development, structure, and, in some cases, situation, and constitute essential characters which distinguish childhood.

Infancy may undoubtedly be called the period of growth. The organs of animal life and of relation are very imperfect, but the organs of nutrition and of organic life are amply provided. The anatomical structures are of greater softness and wanting in consistency as compared with those of the adult.

The capillary and glandular systems predominate; absorption and deposition are active; excretion is frequent, and secretion abundant. The membranes are very vascular, the nervous sensibility acute, the arterial vessels greatly preponderating over the venous vessels. The brain and nervous system are largely developed, but are very imperfect.

THE GENERAL APPEARANCE OF THE NEWBORN INFANT.

The length varies from $1\frac{1}{2}$ feet to a little less than 2 feet. The weight from 6 pounds to $7\frac{1}{2}$ pounds.

The skin is thin, tender, and of a reddish tint, being covered at birth by a whitish unctuous substance, termed *vernix caseosa*.

The scalp is covered by hair, varying in quantity in different cases.

The nails reach to the ends of the fingers.

The body is plump, the limbs round, and the articulations usually flexed.

The upper extremities are more developed than the lower. The umbilicus, or a line or two below it, is generally the median point lying between the two extremes of the body.

The dimensions of the head and abdomen are very large as compared with the other cavities, and with their own dimensions in after life.

The thorax is prominent in front and flattened at the sides, the pelvis being small and contracted, and less developed than the thoracic cavity.

Very little capability of motion is possessed by the newborn infant, whose cries and movements may be regarded as involuntary, and its search for food merely instinctive. Two-thirds of its existence are occupied in sleep, and the remaining one-third in taking nourishment.

THE ORGANS OF DIGESTION.

The mouth of the infant is fully formed, and from the disposition of the lips and palate and the obliquity of the posterior nares, is particularly adapted for the proper function of suction.

The mucous membrane of the fauces, pharynx, stomach, and entire intestinal tract is thick and villous; it is more sensitive and vascular than in after life; its texture is softer, and the mucus much more abundant, although thinner, becoming, however, viscid and greatly increased in quantity when exposed to irritation; any substance, therefore, other than the fluid provided by nature as suited for the nutrition of the infant, must prove a source of irritation of greater or less intensity: hence the diarrhœa characterised by the green offensive motions so prevalent in infants, from being fed with arrowroot and other improper articles of diet.

The stomach and duodenum are fully formed, the mucous membrane being thick, villous, and rosy in tint.

The position of the stomach is peculiar. It is not, as in the adult, placed transversely, but hangs almost perpendicularly, so as to extend from the epigastric to the umbilical region. The omentum, therefore, in the child will be found more to the left than to the right, since it is always attached to the greater curvature of the stomach. The small intestines, in proportion to the entire length of the intestinal tract, are one-third longer than in the adult, and, although the calibre of the large intestines is relatively less than that of the small, their length is greater in proportion.

The appendix vermiformis is extremely long, the cœcum extensively developed, but the valvulæ conniventes are very indistinct.

The pancreas and salivary glands are very large, and apparently especially active. The whole glandular system is proportionately much larger than in the adult, and confers upon the constitution of the infant a peculiar character.

Digestion in the infant is rapid and incessant. The child, if allowed, will constantly take food to repletion, and since the stomach is only able to contain a few ounces of fluid at a time, the extra amount is often rejected without effort.

The chyle is rapidly eliminated and absorbed; the lacteal and mesenteric glands are largely developed and very active.

The gall-bladder is small at birth, but rapidly enlarges, and contains bile, green in colour and bitter in taste, but in infancy this fluid is not so viscid, and abounds less in its peculiar principles than at an advanced age, at which period there is a liability to the formation of concretions.

In the liver after birth remarkable changes take place. A change occurs in the circulation of the viscus. The left lobe decreases, the umbilical vein and ductus venosus are obliterated, the vena portæ is developed, and the secretion of bile is the peculiar function. With the advance of life the liver tissue becomes darker, its size relatively diminishing in volume and receding towards the ribs, but in the infant this viscus extends to the middle region of the abdomen. In some few cases the fœtal proportions of the liver have continued through life.

The spleen presents no especial peculiarities, but is liable to disease at a very early period. It may be felt below the false ribs, chiefly in the middle region, but not in the left

hypochondrium, as in the adult, in whom it can hardly be felt unless diseased.

The bowels at birth are filled with an insipid, odourless, colourless substance, called "meconium," probably a result of the accumulated intestinal secretion. This soon becomes expelled, food occupying its place, but presenting little of the characters of fæcal matter, in consequence of the nature of the alimentation. Thus in infants the bowel-contents are less feculent than at later periods; they are thin, yellowish in colour, and charged with mucus; have little fœtor, but are abundant and expelled frequently—three or four motions being passed daily.

The perspiration is less odorous and saline, and, although not so copious, is more watery.

The urine is retained for a much shorter time than in the adult, and the quantity of its urea is far less.

The mucous membrane of the bladder is peculiarly sensitive, and its muscular coats very irritable. These characters occasionally give annoyance for a time by constant wetting of the dress or clothes. In the infant the bladder is situated higher up, and its shape is more elongated than in the adult; in proportion it is less capacious, and the ureters are especially large. The difficulty of retaining the urine chiefly depends, in all probability, upon the anatomical structure of the parts, in regard to the position of the urethra. In the fœtus the fundus of the bladder does not exist, the cervix, or urethral opening, being then most dependent. In young subjects this condition of the organs still exists to a certain degree.

In the kidneys remarkable changes take place, the lobular formation disappears, and the supra renal capsules rapidly diminish.

ORGANS OF RESPIRATION.

Most important changes take place in the lungs at birth.

Previous to birth these organs were condensed, brownish-red in colour, extremely vascular, and not permeated by air, but they now suddenly increase in size, and after respiration become of a rose colour, vesicular and soft in structure, and crepitate under the finger. The process of respiration in the child is to a large extent performed by the action of the ribs alone; it takes place with a force and rapidity corresponding to or commensurate with the universal activity presented by the system at large. The demand for fresh supplies of blood is incessant.

The inspiration and expiration are equal; they are often repeated, and are the more frequent according to the youth of the subject. During the first year of life they vary from 35 to 40 per minute, those of the adult healthy man being about 13 to 20—viz., nearly double. The expiratory sound is so intensified in force and sonority as to be known by the name of puerile respiration.

This variety of respiration is, under certain circumstances, observed in the adult—viz., when in consequence of consolidation of one lung in pneumonia, or by its compression by the fluid in pleurisy (hydrothorax or empyema), the lung of the sound side is obliged to do extra duty, thus taking on a compensatory action. In this over-active lung is heard the puerile respiration. Less consumption of oxygen takes place in the infant, and the heat-generating power is less than in the adult.

The thymus gland in the fœtus occupies a large, prominent position in the upper and anterior portion of the thorax; but after birth it gradually decreases, and in the adult is scarcely recognisable. It contains a plentiful supply of arteries and

veins, and at first contains a chylous fluid showing that secreting power is possessed by the gland.

In the infant the thymus is not usually longer than 2 inches, broader than $1\frac{1}{2}$ inch, or thicker than 1 inch; but in consequence of the vascular supply and softness of texture a sudden increase of size may take place, and when the gland is larger than usual after birth this augmentation may give rise to very serious symptoms from pressure upon important neighbouring parts. A spasmodic affection (thymic asthma) has been attributed to this cause, and it has, in some instances, proved fatal.

ORGANS OF CIRCULATION.

The circulation undergoes complete change directly the respiratory act is performed; the *heart* is therefore altered, its functions becoming complete, but in the infant preserving some special peculiarities. The volume is large in proportion. The relative capacities of the cavities differ, those of the left side, especially of the ventricle, certainly preponderating; but as age advances gradual alteration occurs, and in the adult the cavities of the right side may be nearly three times the size of the left.

The cardiac parietes are paler and softer than in after life, the texture is firmer, the colour deeper, and the relative bulk is less, greater propulsive power being required as the blood-stream has to pass over a more extended space; the peculiar irritability of the organ renders contractility more active, and hence there is greater rapidity of action.

The pulse in the infant varies from 120 to 140 beats per minute, that of the adult varying from 60 to 80, but the child's pulse in different individuals and under certain circumstances is liable to much variation; and it is well nigh impossible to fix a rate of frequency according to the age.

Conclusions must be very cautiously drawn from the pulse-

frequency in the young child. Position exercises a remarkable influence: the frequency of the pulse will be greatly increased upon changing the child from a recumbent to a sitting posture, especially so if the erect attitude is assumed and the child is in motion. In very young infants, even under six months, the pulse may remain unaffected during serious illness, and, on the other hand, in older children, perhaps six or seven years of age and perfectly healthy, the pulse which at night during sleep has been so steady and full, may become in the day-time ever too hurried and small.

It may be safely stated that the rapidity of the pulse is greatest at the period of invasion, and from that time its frequency gradually diminishes. From five months to two years the mean number of the pulse beats may be placed at 130: from two to four years of age, at 105; the number continues almost the same to the tenth year.

The ganglionic or sympathetic system is very perfectly formed at birth.

THE CEREBRO-SPINAL SYSTEM.

The brain is large in volume, but very imperfect in structure in the infant, being almost fluid, and containing a much greater quantity of water than albuminous matter. Its hue is reddish, the cortical portion being less deeply coloured than in the adult, and the convolutions are less marked.

The new-born child is incapable of thought, and appears devoid of perception, its brain being unequal to the due performance of those high functions by which man asserts his superiority; but *pari passu* with the increased vigour of the heart the brain acquires more energy. The exact changes taking place in the brain are not accurately known; the quantity of phosphorus present is far less in the child than in the adult, this element decreasing again with advancing years.

The increase in size of the brain continues until manhood, and the relative size of its components continually varies during the first years of existence, but in all probability all its parts are not fully developed until about the seventh year.

The weight of the brain of the new-born babe rarely exceeds 10 ounces; this organ in the adult may average about $3\frac{1}{2}$ pounds—at times a little less, but in some instances it has exceeded $4\frac{1}{2}$ pounds.

The brain diminishes in relative and general size in advanced life, and its specific gravity has been stated to decrease from $\frac{1}{20}$th to $\frac{1}{15}$th.

Its quality becomes rigid, and a second time unequal duly to perform its functions. The cerebellum at birth presents a somewhat higher organisation than the brain; about puberty the cerebellum becomes much increased relatively to the cerebrum, and may be nearly twice as large in proportion to its size at birth. The spinal medulla is extensively developed, and is apparently more mature in structure and more advanced in performing its functions than the brain.

The infant constitution is decidedly nervous. Its nervous susceptibility is notable, and its general susceptibility acute. The nervous feature is no doubt due to the great amount of nervous matter, the softness of the texture rendering it peculiarly susceptible to impressions; and this fact is of paramount importance in the treatment of all forms of disease in the infant.

As the infant grows older, signs of intelligence manifest themselves, since the brain becomes capable of receiving impressions through the senses; but the nerves of sensation, although well developed, are still but imperfect in their functions.

With regard to particular senses—

The Sense of Vision, although the eye is fully developed, does not seem to exist in the new-born infant, but it has been shown that upon the retina perfect images are formed.

An object brightly illuminated appears to attract attention, the eye being fixed upon it or following it apparently in a passive manner.

The babe is always pleased with light, and at all times appears to dislike darkness; but, on the other hand, a very brilliant light is both annoying and injurious to the eye.

The Sense of Hearing is at first as little developed as that of sight, and there is reason to doubt if the young babe can hear at all—for some time it certainly does so very imperfectly, since the structure of the external ear is deficient, the pinna being very inelastic, the tympanum small, the tympanic membrane oblique, and the whole being covered by a soft membrane, a condition of things ill suited for receiving or collecting vibrations of sound.

The Sense of Taste exists early, but possibly the perception of flavour is less in degree than might at first be supposed.

The Sense of Smell may be exhibited early, but the apparatus connected with it is not well formed, and probably is not capable of delicate perception. The absence of speech, or of articulation—the characteristic of infancy—must not be accredited to imperfection of the vocal organs, although it is true that these are in a state of imperfect development.

The larynx is nearly circular and small; the lips of the glottis and the superior ligaments being consequently exceedingly short—a condition, in conjunction with the feeble muscular development, causing the peculiar wailing cry and feeble shrill tone of the young infant. The acquirement of

speech is connected not so much with changes of mechanical structure as with the advance of intellect.

Alteration proceeds very gradually in the larynx until the age of puberty, at which period a change of tone in the voice is produced, since enlargement of the rima glottidis takes place, the thyroid cartilage and thyro-arytenoid muscle becoming elongated. A slight change only takes place in the female larynx, the acute tones which are peculiar to the voice of childhood still remaining in women to a greater or less extent; but in the male organ of voice a deep and graver sound is produced, varying in depth, pitch, and *timbre* in different individuals. The power of articulating intelligible sounds is more intimately connected with the increasing development and force of the muscles of the mouth and pharynx, which, being necessary for sucking and swallowing, are early developed—even before the dawn of intellect.

The infant begins to utter articulate sounds at from six months to a year old, and in general it is able to speak plainly at from two to three years of age.

The Sense of Touch, or that perception by which the presence and qualities of bodies are recognised, is but little developed in infants; in fact, it exists almost entirely in the hands.

The chief cause of the deficiencies of the senses in the infant is the imperfect condition of the muscular apparatus, the aid of muscles being necessary for the exercise of all the special senses.

APPARATUS OF LOCOMOTION.

Bone and muscle, the chief components of the organs of locomotion, are but imperfectly developed in the child.

The bones of the head and chest, necessary for the enclosure and protection of important organs, present more advanced ossification than those merely intended for the

support of muscles or for locomotion. These latter are very imperfectly ossified, and exist only in the form of cartilage.

The annular parts of the vertebræ, forming the medullary canal, are strongly ossified at birth. The bodies of these bones, however, destined at a later period to sustain the weight of the trunk and head, are almost destitute of earthy constituents, and are but slightly expanded. The processes to which the muscles concerned in the extension and flexion of the vertebral column are subsequently attached, in infancy scarcely exist, or are merely cartilaginous.

The bones of the infant generally are noticeable for their small size, red colour, and soft texture. They are very vascular, the earthy portions being proportionately much less than in the bone of the adult, and the animal constituents are far less firm, since the proportion of gelatine is greater.

The voluntary muscles are easily torn, are of a pale colour, slender in shape, and of soft consistency, and as yet the "bellies" of the muscles are unformed. They present less fibrin than in after life, their fibres being only loosely joined together, no fasciæ or aponeuroses enclosing their fasciculi; the ligaments and tendons, or appendages of the muscles, are similarly imperfect. The muscular irritability or tendency to contract, although less easily sustained than in after life, is more easily excited in the child; consequently motions are quickly, or suddenly, or often performed, but are incapable of sustaining continued efforts, or of effecting powerful action.

The infant commences its attempts to walk at about twelve months of age, and has usually between the second and third year acquired the power of walking alone. Such efforts entail manifold mischances, to anticipate which Nature has provided a protecting shield of defence by liberally encasing the body of the child in yielding elastic areolar tissue.

DEVELOPMENT AND GROWTH.

The progress of development in the child is uniform, the successive growth of different parts observing stated periods and a well-known order. As the infant grows older, the digestive canal becomes less sensitive and digestion less active. Food is not so frequently required, and may be more varied in its nature, a more stimulating kind of diet being well borne and necessary.

The secretions begin to bear a close resemblance to those of the adult, and the evacuations, being no longer voided independently of the will, require to be passed less frequently.

The involuntary muscles generally lose their *puerile* irritability, gaining more tonicity, and becoming deeper in colour and firmer in structure.

The pulsations of the heart become less frequent, the pulse at the wrist decreasing in rapidity and the respiration becoming slower, its attribute of puerility by degrees disappearing.

The activity of secretion abates, the membranes becoming less sensitive and vascular.

Mucus is secreted naturally in less quantity, and is not now poured out so abundantly, even when exposed to irritation.

The arterial branches do not so much preponderate over the venous, nor are the capillary vessels so abundant.

As childhood advances, the activity of the cerebro-spinal system becomes more manifest, that of the ganglionic system of nerves being less evident, and the attributes of infancy becoming gradually lost, the body assumes the character of adult age.

During the stages of advance, the progress made in the power of sensation, perception, voluntary motion, or in the

organs of animal life, are very striking. The senses expand rapidly and in succession.

Perception originates, in due time followed by reflection. The child is thus capable of voluntary efforts, and muscular power is in proportion developed and brought into play. As the several senses are exercised, so do they improve, and by correcting or corroborating the impression received by each they mutually assist each other. Although the progress of growth in the organs peculiar to the senses, the intellect, and voluntary motion is remarkable, yet it is unequal in advance, and slow in completion. The perfection of these organs terminates the process of growth, and it is not entirely completed until the period of maturity or near middle life. For the full exercise of the several senses it is necessary that the bones and muscles associated with the apparatus of the organs of sense should be perfectly developed, and this development is not fully completed until long after childhood. Early impressions are probably very acute, whether by reason of their novelty or from the sensibility of the nerves; and they appear to be remembered as especially pleasurable.

The most noted feature of growth is the advance in the organs of voluntary motion, viz., the development of muscular power and the knitting of the frame. The shape of the skeleton and its component parts greatly alters, and the chemical composition of the osseous system changes. The relative development of the pelvis and of the lower extremities becomes better proportioned to that of the thorax and the rest of the body. The alternate curves of mature growth are more evident in the form of the spine. The shafts of the bones become firmer and more intimately united to their heads, whilst the processes shoot out. The calcareous matter gradually increases in quantity until the bony growth is complete.

During the advance of the bones the muscles assume a deeper colour, their fibres become firm and well defined; being developed so as to form the central fulness or "belly;" more fibrin at the same time enters into their composition, and the tendinous appendages and aponeurotic sheaths now appear. The child loves exercise, but its muscular power is soon expended, and rest becomes necessary. The limitation of this corporeal power acts as a moral as well as a physical check, full strength being undeveloped until the advent of a controlling and mature intellect.

With regard to the progress of growth in the cerebro-spinal system: the spinal medulla enlarges with the elongation of the body, until it bears a greater proportion in size to the brain than was apparent at birth. The growth of the brain and enlargement of the head within the first year after birth, and especially during the first four months, is remarkable; at this period the skull-bones are in a very imperfect state of ossification, and they, in consequence, readily allow of the cranium and its contents enlarging rapidly. The fontanelles also aid in delivery by permitting the bones to overlap one another, and thus reduce the bulk of the head.

At birth six deficiencies of ossification are observable, the spaces being enclosed by membrane, and there being as yet no appearance of the sutures. The chief opening is termed the *Bregma*, which lies at the top of the head, between the parietal and frontal bones. Another opening is situated behind, between the parietal and occipital bones of the two remaining openings (each being double): one appears in the temporal fossa on each side, and the other above each mastoid process.

These openings sometimes inspire the ignorant with alarm, but they are, in reality, a source of great advantage, since they mitigate the effects of blows or falls upon the cranium,

thus intercepting the shock and its effects upon the brain. In cases of disease, also, they lessen the dangers from effusion, by permitting rapid expansion, and thus diminishing the results of compression.

By degrees these apertures close naturally, and are in general perfectly united by the end of the fifth year, at which period the sutures are well marked and formed. The fontanelles are occasionally later in closing, the ossific process being imperfect and slow; in this case a general delicacy of constitution is present, and the child is often of a strumous habit.

Not only does the *size* of the brain increase in the child, but its *structure* also alters, proceeding to more complete organisation, especially when the first indications of intelligence appear. Before the appearance of the first teeth the advance in size is most striking, but after this period that of the alteration of the structure is most remarkable.

The brain now becomes less vascular, but more firm and consistent. There is a more pronounced difference between the cortical and medullary portions. The colour of the former is deeper, that of the latter less red. The peripheral surface is more extended since the convolutions are better marked. This advance in quality and quantity proceeds until the age of seven years—*i.e.*, about the period of the second dentition—and is in many respects remarkable, since the volume of the brain becomes considerable, and its structure apparently similar to that of adult age. The increase in size and advance in structure after this epoch is still observable, but in a far less remarkable degree.

Now it is that the character begins to develop, the mental endowments of the individual being in some measure indicated. Features are now formed, and traces of a marked disposition are exhibited by the physiognomy. In regard to the countenance, the development of the muscles and the

bones connected with the face which takes place about this age must not be overlooked. It has been stated that in the adult, when the circumference of the head taken above the orbits is not more than 13 inches, idiotcy always exists; and one observer has found that complete idiotcy existed when the above measurement varied from 11 to 13 inches, that of the root of the nose over the head to the occipital spine giving between 8 and 9 inches. In the full-sized head the latter measurement should average 14 inches; the former 22 inches.

Feebleness of character is a usual accompaniment of an extremely small head; but, on the other hand, the head may be large and the individual dull, in some cases even an idiot, the deficiency not existing in the size of the brain, but in the quality and structure of the organ. Neither the size nor structure of the brain appears to advance equally in all parts. It has been observed that during the first months the increase in size is most noticeable in those parts at the base of the skull which are situated in the inferior and anterior portions of the frontal bone. As to the cerebral convolutions, firmness of structure is soonest acquired by those parts which are situated in the middle and lateral portion of the base.

It is well-known that the full development of the cerebellum does not take place until about the time of puberty.

As growth advances the head varies in shape, as well as in size, different parts of the brain having a different relative proportion at different ages, especially during youth. At all periods there is apparent a certain degree of individual peculiarity and capability of alteration in size, either by diminution or increase. With the relative advance in structure and size in the various parts of the brain, the successive development of the several intellectual and moral powers takes place. Disposition and intellect are gradually

unfolded, and injurious, perhaps dangerous results are certain to follow any endeavour to force the one or the other prematurely. The so-called cultivation of the mind is, in reality, only the exercise of the brain, and if this be overworked it must become weakened or destroyed, like any other organ of the body.

Before the child reasons he observes; reflection follows perception; he early notices and remembers things, and their relations and qualities. He constantly inquires what is this or what is that, and why?

The advance of the senses is still more rapid than that of the perceptive faculties. The eye that sees well, and plainly distinguishes the form and size of objects, may be unable to recognise differences of colour. The ear that is keenest in hearing may yet be musically much deficient—*i.e.*, may not be able to recognise one melody from another, or appreciate the difference between *in tune* and *out of tune*.

The different degrees of talent in children depend considerably upon the possession of the faculties which recognise the physical properties of things, and upon the judicious manner in which those perceptions are handled and encouraged.

Superiority of intellect depends upon a due balance between the reasoning and perceptive faculties. The smartest boy—*i.e.*, one in whom the perceptive faculties preponderate—does not of necessity become the cleverest man. The child in whom the reflective faculties are in excess may be reckoned dull, since his apprehension is slow; but he may, nevertheless, exhibit powers when the time arrives for their exercise, which had not been foreseen. These results are quite as much affected by peculiarity of disposition as variations in talent. Application and industry may often achieve more than brilliant talents combined with a careless disposition. Even from the earliest age a child

frequently shows a marked disposition, and occasionally peculiar talent. Some infants are affectionate, gentle, or timid, almost from the moment of birth, whilst others are passionate, peevish, or obstinate. A weak parent may even be governed by a determined infant; and, again, the child of very gentle disposition, no matter how intellectual he may be, may never acquire sufficient strength of character to make his way in the world.

The loftier sentiments are in general more tardy in development, superior moral powers, such as those of justice and high principle, being among the latest to develop, since aid is necessary from the intellect to direct and sustain them.

The child is undoubtedly gifted with moral and intellectual powers, which vary in different individuals, and constitute differences of character, thereby serving as a guide indicating what must be repressed, what cultivated, and what is possible to be accomplished.

To acquire an insight into the primitive faculties of man, as well as the laws by which their natural development is regulated or affected by artificial training, is a matter of paramount importance, and the need of this knowledge is not limited to the structure connected with the manifestations of the mind, but also extends to all the other systems of the body, whether circulatory, digestive, nervous, or muscular, for by due attention to each it is possible to secure for the whole the utmost advantage during the period of growth or development.

In reference to the general growth of the body and the progress in weight, height, and strength, differences take place from sex and age. It is stated that the average weight of the male infant at birth exceeds that of the female by about half a pound, and the length by about an inch more.

The growth of the female infant annually is less than that of the male, but her development is more early completed.

Immediately after birth the infant diminishes in weight, and it does not again begin to increase sensibly until after the first week.

The growth of stature proceeds with most rapidity during the first year, and amounts to nearly eight inches. As the child approaches the fourth or fifth year the growth is less rapid, and the ratio appears to decrease with the age up to that period. The growth in the second year is only half that of the first; in the third year, only one-third; afterwards it increases with a fairly regular progression.

Average Heights and Weights of Man in Infancy to Fifteen Years of Age.

Reduced from the French weights and measures given in Quetelet's "Anthropometrie" (Brussels, 1870). They are the arithmetric means (averages) of a large number of observations chiefly on inhabitants of Brussels; it is probable that they are a little under the mark for English children.

	MALES.			FEMALES.	
Age in years.	Height in inches.	Weight in pounds.	Age in years.	Height in inches.	Weight in pounds.
Birth	19·7	6·8	Birth	19·3	6·6
1	27·5	19·8	1	27	18·9
2	31	24·2	2	30·7	24·2
3	34·2	27·5	3	33·6	27·2
4	36·6	30·8	4	35·9	30·5
5	38·8	34·9	5	38·5	33·6
6	41·2	39·1	6	40·7	36·7
7	43·4	43·3	7	42·9	39·1
8	45·7	47·5	8	45·5	41·8
9	48·1	51·7	9	47·4	46·2
10	50·4	55·4	10	49·2	50·8
11	52·5	59·4	11	50·6	56·1
12	54·5	68·8	12	52·7	63·8
13	56·4	72·8	13	55·8	71·5
14	58·6	81·6	14	58·1	79·8
15	61	90·6	15	58·9	88·0

A notable difference may often be observed in the degree of development, or proportional growth of one system of organs more than another, and hence the predominance of the class of functions performed by one or other system of organs. This circumstance leads us to recognise certain temperaments, viz:—

1. The *Cranial* or *Nervous Temperament*, in which the head is very large, great intelligence and liveliness are exhibited, the cerebral system of nerves preponderating.

2. The *Thoracic* or *Sanguineous Temperament*, in which great muscular power is early exhibited, the chest being large, the complexion florid, and the body well nourished, the circulatory system preponderating. The child, although active and strong, is not remarkably intelligent.

3. The *Abdominal* or *Lymphatic Temperament*, in which the abdomen is large and the circulation languid, the face is pallid, the appetite large, the child is dull, and the mind and body both inactive, the abdominal organs preponderating.

The form of the features or expression of the countenance may somewhat indicate the temperament, whether nervous, sanguineous, or lymphatic. The development of the forehead may indicate the proportional size of the encephalon; the portion between the forehead and mouth is usually in harmony with the development of the thorax; and the size of the lower part of the face is in relation to that of the abdomen.

In some cases no strongly marked temperament exists, or a mixed temperament is observable if the cavities are in an exact proportion to one another.

The abdominal temperament has a tendency to prevail in infancy and childhood.

The nervous temperament is more especially manifest at or after seven years of age, the brain then attaining a greater development.

The thoracic temperament is exhibited at a later period, in proportion to the increasing development of the thoracic organs.

This subject demands careful attention, and it is intimately concerned in the modification of the plan of management equally in health and disease.

These different temperaments or constitutions may be regarded as hereditary, or born with the child; they will, however, be greatly influenced by the way in which each individual is managed, and according as each system of organs is neglected or exercised, the essential point being to supply to each an appropriate amount of occupation, in order to strengthen ill-developed or weak organs, repressing those which are developed disproportionately, or are over-active, by ensuring their quiescence.

At first, then, the infant appears as merely a vegetative being, the organs of nutritive life preponderating in activity and development. With the progress of youth, however, it urges its claim to a higher existence; the organs of organic life relatively diminishing in importance, those of animal life advancing and eventually preponderating, and the child becoming a rational being.

DENTITION.

The mouth of the infant at birth is characterised by absence of teeth; still, in a few instances, infants have been born with teeth, and, on the other hand, in some cases the teeth have never grown.

The teeth generally appear first about the sixth or seventh month, but dentition is frequently delayed to a much later period, and may also be much earlier—viz., at the third or fourth month. The process of dentition is usually complete during the first year or year and a half; it may, however, be protracted beyond the second year.

The first set, Deciduous, or milk teeth, are twenty in

number. They generally appear in pairs, those of the lower jaw presenting themselves before the corresponding pairs in the upper. The middle incisors first appear, then the lateral incisors, and next the anterior molars ; but the canines occasionally precede. Last to appear are the posterior molars—viz., at a time varying from the twentieth to the thirtieth month. The following table expresses the above facts :—

From	5 to 8	months	appear the 4 central incisors.
,,	7 to 10	,,	,, 4 lateral incisors.
,,	12 to 16	,,	,, 4 anterior molars.
,,	14 to 20	,,	,, 4 biscupids.
,,	18 to 36	,,	,, 4 posterior molars.

In the embryo, rudiments of teeth may be observed as early as the seventh week. The teeth are now considered to be dermal appendages like the hair. As their size advances, they each consist of a double membranous sac, from the bottom of which springs a pulp composed of vascular and nervous matter, and surrounded by a colourless consistent fluid, which, as the pulp increases in size, becomes gradually absorbed. Upon the top of this pulp the future tooth is moulded, and here calcification first appears about the end of the fourth month ; the enamel being simultaneously produced and developed from the epithelium. The cementum or crusta petrosa is derived from the vascular lining of the dental sac. Alveoli are formed, through the channel or groove which had run uninterruptedly along the edge of the jawbone being now divided by bony septa which grow across.

It has been stated by some authors that the formation of the tooth takes place by conversion of the vesicles or cells of the pulp into the fibres or cells of the ivory by the deposition of bony matter.

In most of the first set of teeth, at birth, calcification is advanced, the crowns of the incisors are generally com-

pleted, and much of those of the molars is formed. Calcification of the root follows that of the crown, and with the advance of the calcific process elongation of the roots continues, until the teeth can no longer be contained in the alveoli, and each tooth is pushed upwards, the process being assisted by the development of the alveoli.

The "cutting" of the tooth is occasioned by the absorption of the surface of the gum and the apex of the sac surrounding it, a passage being thus provided for its exit. The cutting of the tooth is a natural process, and does not of necessity induce morbid action, but disease is apt to occur from the special irritability of the constitution of the infant at this period, in addition to the liability to sympathetic disturbances.

The passage of the tooth through the gum must produce irritation, in consequence of the pressure of the root on the dental nerves below, and of the crown on the parts above.

Pain thus arises, and this is the chief cause of the morbid sympathies attendant upon dentition. Very little suffering accompanies the cutting of the large double teeth compared to that of the smaller ones, which appeared when the greatest susceptibility of the constitution existed ; and therefore the degree and intensity of the morbid sympathies depend less upon the extent of the local irritation occasioned by the tooth than upon the condition of the infant at the time.

During teething, an increased quantity of saliva flows from the mouth, and more or less hardness, swelling and heat of the gums are present. The child is apparently thirsty, for it takes the breast more often. Everything it takes hold of is thrust into the mouth : this act is probably performed quite as much from the early instinct of mastication as from the irritation of the gums. Fretfulness and startings in the sleep are not uncommon. The stomach and bowels are liable to disturbance, food being rejected or slight diarrhœa

occurring. These symptoms frequently precede the appearance of the tooth by many weeks, subsiding in a few days —viz., eight or ten to fourteen days. As the teeth arrive at the surface of the gum these symptoms may again appear.

It is customary to ascribe to dentition all complaints arising at this period, but this is an error which in many instances may lead to mismanagement. At all times when a child is ill at the period of teething the gums should be carefully examined, but attention must not be paid exclusively to the gums; the ailment may be an accidental complication, and, even when associated with dentition, may itself demand active treatment.

Attention to the gums alone may prove ineffectual, and neglect of the condition of the gums may render all other treatment useless.

The larger the number of teeth appearing together, and the more suddenly they are developed, so will be the local irritation, especially when any obstacle exists, such as a disproportion between the rate of development of the jaws and teeth.

The constitutional disturbance is more severe, according as the age at which dentition commences is early, and will be augmented by any cause tending to deteriorate the general health—as bad air, improper food, etc.

The delicate child is a more constant sufferer than the robust, since in the former dentition is tedious, and intestinal disturbances with marasmus are frequent accompaniments.

Any malady contracted at this period, such as whooping-cough, measles, or bronchitis, is increased in severity, and any disease to which the child may be predisposed is liable to development.

Dentition must not be regarded as a universal source of infantile disease; it is true that many ailments may be traced

to its source, but in the majority of instances teething is merely incidental to other maladies.

Inflammatory affections frequently arise from, or are complicated with, dentition, but many of the symptoms are essentially nervous.

The local symptoms of irritation in the gums are occasionally very severe, and in these symptoms lies the origin of all the rest. The swelling, redness, heat, and pain in the gums during the first irritation or "breeding" of the teeth, may be so great as to render these situations intolerant of the slightest pressure. The redness of the entire gum is very intense at a later period. During the coming forward of the tooth, pressure may rather relieve than increase the uneasiness, and now the redness is confined to the base of the gum, the surface of which is white, and appears like a vesicle surmounting the tooth. Stomatitis or aphthæ may be present, and the cervical and salivary glands may be enlarged and painful, the flow of saliva being profuse. The head may be hot and heavy, the eyes suffused and watery, and the cheeks swollen and red. Much thirst, heat of skin, restlessness and weariness, with disturbed sleep, are not unfrequent accompaniments.

The above symptoms constitute the symptomatic fever, which is notable for its variability and sudden character, often remitting and recurring within a few hours. Distant organs soon become implicated, suffering sympathetically from mere nervous disturbance or inflammatory disease.

Many acute inflammatory conditions are undoubtedly immediately associated with dentition, since when the irritation of the gums is relieved they rapidly disappear, but are little mitigated by any ordinary remedial means so long as the irritation exists. Nevertheless, these conditions may sometimes occur during dentition, although quite independent of the process which predisposes to them.

Far more frequently does nervous disturbance of different organs take place in connexion with teething. To recognise and distinguish these two conditions is a matter of great importance in practice.

Some of the secondary affections are, no doubt, of a salutary character, nature affording relief by counter-irritation, as observed in the looseness of the bowels and the excess of salivary flow consequent upon dentition. So long as they are only sympathetic, little interference is required, and, in fact, to suppress them suddenly is a dangerous proceeding. On the other hand, it must not be supposed that treatment is never to be employed, or that children should be allowed to sink from vomiting or purging merely because their teeth are coming.

Of all secondary affections, those of the mucous membrane are most common to appear, and the membrane by far the most frequently affected is the gastro-intestinal mucous membrane. The lungs, skin, lymphatic glands, brain, and nerves are, however, by no means exempt from this irritative disturbance. The urine, also, may be copious and pale, as in hysterical affections of adults ; and it may at times be turbid and scanty during high fever, or when the bowels are specially disordered. Great pain may attend the passage of the urine, or even purulent discharge from the urethra may take place.

In the production of entero-colitis dentition exerts the strongest influence, and is indeed a very powerful agent in the causation of diarrhœa and enteritis. The simple diarrhœa so apt to occur in children at the period of the first dentition is often the commencement of chronic intestinal lesions, which finally reduce the sufferers to extreme debility and emaciation. Careful investigation will generally show that almost all cases of inflammation and even tubercular deposition date from the period of dentition, from the period of weaning, or from the time at which some considerable

change in the character of the regimen was made. It is stated that diarrhœa and entero-colitis are much the most frequent between the ages of six or seven months and two or two and a half years (exactly including the period occupied by the first dentition), while these affections are met with only exceptionally after three years of age. Dentition, again, is an exciting cause of convulsions.

Laryngismus Stridulus, the so-called spasmodic croup, occurs most frequently during the last half of the first and first half of the second year (the very period at which the dentition process is most active), from reflex irritation of the gums. The majority of cases of atrophic infantile paralysis occur between the ages of six months and two years, the period of primary dentition; but it is probable that early age and dentition only act indirectly by inducing a remarkably susceptible condition of the entire spinal system, since the paralysis occurs when this system is very impressible, the causes which induce it being trivial and usually entirely overlooked. If rickets occur before the completion of primary dentition, the development of the teeth is always impeded; they are not only cut late, but they also either decay or fall early from their sockets.

Sleeplessness, startings, or sudden waking from sleep with screaming, are often induced by symptomatic disturbance of the brain or nerves. Convulsions are likely to follow grinding of the teeth, and rapid tremulous motions of the lips. The brain is sure to take part, sooner or later, in all severe derangements of the bowels; but this organ itself may be disordered without the bowels being of necessity disturbed. The convulsions often consist of mere spasmodic movements of the eyes, face, and arms, and need give rise to little anxiety, unless they become general, frequent, and violent, since in this latter case death may result, apparently from apoplexy, or incurable paralysis may follow.

As in the case of all affections of the head in the infant, it must be remembered that the plethoric condition as well as its opposite, the asthenic, may occasion the symptoms.

An affection of the feet and hands, chiefly characterised by spastic contraction of the flexors of the toes and thumbs, has been described as connected with dentition, accompanied by a peculiar swelling of these parts, of a purple hue, cooler than the neighbouring skin, very round and elevated, and arising suddenly. It usually ends favourably in a few days, although in some instances it may last for some weeks, and, as soon as the tooth appears, it spontaneously ceases. Of the spasmodic affections associated with teething, the most frequent is dry, irritative, nervous cough, which is always increased by bowel derangement. This is at once removed or relieved upon the eruption of the tooth. Diseases of the skin are common in dentition, termed "tooth or gum rashes," the most familiar of which is Strophulus; but these must not be considered as arising directly from teething, unless they disappear and appear in direct connexion with the condition of the teeth. In scrofulous infants the teeth are often cut early, and the process is generally unfavourable, especially when accompanied by chronic hydrocephalus or by deficient ossification in the head bones.

The most frequent symptomatic affections are purging and vomiting. The purging is remarkable for the absence of pain on pressure over the abdomen. The tongue is white and moist, the child does not lose flesh, and the appetite is unaffected. Flatulence, griping, and acidity are frequently present, when the motions are green and offensive, as is also the breath. So long as the strength remains unimpaired, and no indications of inflammation appear, caution must be exercised in interfering with slight purging and vomiting.

If dentition, as a natural process, advances favourably,

little interference is necessary. The child should be kept cool and quiet, and much in the open air. The bowels should be kept somewhat free, great care being taken not to overload the stomach. Towards the completion of dentition the general strength of the child usually suffers a little, and an improved diet may be demanded, such as chicken broth, etc.

If no special irritation is present in the gums, the less medication is employed the better. To relieve the tenderness of the gums, one of the first symptoms of teething, the best method is gentle friction with the finger, which may be previously dipped in some fluid—as cold water which has been sweetened. When the tooth is coming forward, pressure on the gums appears to be agreeable; and at this period hard and smooth substances—as ivory rings and coral—afford satisfaction. A small wax candle and sometimes a stick of liquorice-root are useful, but a crust of bread is generally quite sufficient. If there is great local irritation, the gums becoming swollen, tender, and hot, the tooth is evidently about to appear. For the relief of the tension and irritation, a crucial incision may be made.

When it is intended to liberate the tooth by opening the gum, an incision must be made firmly through the gum and the capsule, until the instrument is felt to grate upon the tooth. In the case of a molar the incision must be double or crucial, in order to inclose a small flap. The head of the child is held firmly by an assistant, the operator standing in front of or behind the patient, according to the position of the tooth, the forefinger of his left hand keeping the cheek and tongue out of the way, whilst the incision is made in a longitudinal direction. If it is difficult to get the child to open his mouth, a never-failing plan is to press firmly with the thumb and finger upon each cheek. Good always results from the hæmorrhage of the gum, which never

need cause any alarm. Scarcely any pain attends the operation, and speedy relief invariably follows. The tooth does not always show itself, although the capsule be opened, and the operation in some cases may have to be repeated; but if relief is afforded to the local distress, the absence of the tooth alone does not demand its renewal.

If the local irritation is extreme, the gums should always be lanced, since this proceeding will certainly alleviate and frequently remove any accompanying symptoms, especially those of a nervous character, and even when these are inflammatory much good may often result.

Permanent Teeth, or Second Set.

About seven years of age the first set of teeth begin to be shed, being replaced by the permanent or second set, of which the entire number are now more or less calcified, except the "wisdom teeth," or "sapientiæ dentes"; in these last, as a rule, calcification does not take place until about the ninth year.

The permanent teeth are developed in the following order, between the seventh and twelfth years, as follows:—

The first permanent molars	about the	seventh	year.
Lower central incisors	,,	,,	,,
Upper central incisors	,,	,,	,,
Lateral central incisors	,,	,,	,,
First bicuspids	,,	,,	,,
Second bicuspids	,,	,,	,,
Second molars	,,	,,	,,
Canine . . .	about the	twelfth	year.

Changing the teeth may occupy from five to six years in the completion, but the process is subject to considerable variation as to the period of commencement and duration, great irregularity prevailing with respect to the age at which the "cutting" of the several permanent teeth takes place. The first appearance of the permanent teeth

may be as early as five years of age, or not until eight, or eight and a half, and the end of the process, or cutting of the "wisdoms," may be protracted until the seventeenth or nineteenth year, and even to a later period, or not at all.

As in the case of the first set, in the second the teeth of the lower jaw usually precede those of the upper; and before the loss of the temporary central incisors the permanent molars often pierce the gum, the appearance of these really indicating the coming change.

It would appear that the immediate cause of the alteration in the milk teeth is due to the obliteration of their artery and its canal, which occurs more or less completely about the seventh year, the sockets and fangs becoming absorbed.

The absorption of the root may be due to absorbent cells or osteo-clasts. The permanent teeth, on the other hand, are provided with separate sockets of their own, and, owing to the prolongation of the jawbone, which happens at this age, do not lie immediately beneath the corresponding shedding teeth.

It is the presence, and not the pressure, of the new teeth that is needful; for when the temporary teeth remain, it is found that the corresponding permanent ones are not formed. In the fœtus it is observed that the germs of the majority of the second set lie below or behind the first.

Great difference is observed in the powers of motion and in the form of the jaws of the adult as compared with those of infants, in consequence of the length and perfection of the articulations of these parts. In the child the jawbones, anterior to the ascending plate in the lower, and anterior to the tubercle in the upper jaw, are of a semicircular shape; the articulation is very imperfect before the production of the teeth, the size of the glenoid cavity little exceeds that of the condyle, and the articular eminence is not yet formed.

The centre of motion really resides in the condyle, and the movements are limited to simple elevation and depression, with little or no power of rotation—all, indeed, that is necessary to the infant for the mastication of its simple food.

With the growth of the jaw, elongation chiefly occurs between the second bicuspids and the tubercle in the upper jaw and the same teeth and the ascending plate in the lower, on the site of the permanent molars and posterior to the temporary ones.

The cutting of the second set is rarely attended with distress. If local irritation happens, the constitution is little affected, since by this time it has lost acute sensibility; at times, however, considerable local trouble and subsequent constitutional disturbance accompany the process, and free use of the gum-lancet will be indicated. If the teeth come up with great irregularity—pressing against those before them or protruding by their side, some of both sets appearing together—extraction of one or more of the first set may be needful.

The use of the tooth-brush should early be instilled into children, the teeth being brushed with a soft brush and water once, or even twice, a day, or, better still, after every meal. Too much importance cannot be attached to this operation. The brush should be used both across the teeth and horizontally, *i.e.*, from above downwards for the upper, and below upwards for the lower teeth, it being necessary that every particle of food should be removed from between the teeth.

From six to twelve years of age the child should be constantly seen by a dentist, in order that the teeth may be properly regulated.

It is particularly desirable that the temporary teeth should not be taken out too early, since this proceeding may be followed by contraction of the jaw.

With regard to the clinical evidence afforded by the teeth, a peculiar honeycomb eroded tooth is indicative of infantile stomatitis, whether produced by the use of mercurials, or by other causes.

The malformations due to syphilis and those due to stomatitis are often, if not usually, found in the same mouth, since most syphilitic children have taken mercury in infancy.

Dental malformations denoting syphilis are not of the nature of erosion, as is the case with those following stomatitis, but they consist in very peculiar arrests of development. It is only to the malformations affecting the upper central incisors of the permanent set that much importance can be attached, when there is an arrest in the growth of the middle denticle, leaving a single central notch, but usually also a dwarfing of the tooth in all its dimensions. Sometimes a screw-driver tooth is almost as characteristic as a notched one. The defects are generally symmetrical, but not always.

The malformations which imply previous stomatitis consist chiefly in defective formation of the enamel. The teeth which most constantly exhibit these are the first permanent molars, the two bicuspids being remarkable for their exemption.

The first permanent molars may be considered the test teeth for infantile stomatitis, just as the central incisors are for syphilis, but they are by no means the only teeth affected.

Next in importance come the incisors, which are almost constantly pitted, eroded, and of a bad colour, frequently exhibiting a transverse furrow traversing all the teeth at the same level. It is possible that some stomatitis teeth may result from mercurial stomatitis or from thrush, and that others may have been induced by a stomatitis due to nervous influences, and in both cases inflammation is the local process causing the defect.

The use of mercurials in infancy is undoubtedly a cause of eroded teeth, and the frequent coincidence of syphilitic with mercurial peculiarities renders it a matter of difficulty to establish the exact causation, but a neglect to discriminate between the two agencies may lead to innumerable errors.

CLINICAL EXAMINATION OF CHILDREN.

Inspection.—If the child is asleep:

Note the attitude, whether the posture is natural or the reverse.

The colour of the face. Is it pale or flushed?

The colour of the lips. Are they livid or white?

The condition of the skin. If it is moist or dry, and whether limited to the forehead and head, or is it general?

The expression of countenance. Is it natural or indicative of pain?

The action of the alæ nasi. Are they quiet or twitching?

Is there any moaning, starting, or grinding of the teeth?

The respirations. What is their number?

Are the eyes staring, closing, or partially closed?

The state of the fontanelles. If they are open or closed, retracted, distended, or strongly pulsating.

The pulse under two years should vary from 90 to 130, but consistently with health after 3 years it is seldom above 100. Although not more than 70, it may still be healthy. The absolute number of beats is of slight importance; but a slow pulse in a child is a serious indication.

The shape and size of the head must be observed, if this part is hot or large or presenting enlarged veins.

If the child is awake:

Is it smiling or frowning, is it excited or quiet, languid or fretful, are the eyes surrounded by a dark circle?

Is there any snuffling?

An infant in perfect health should sleep 20 hours out of the 24. It is, therefore, important to discover if a child's illness began with broken rest or sleeplessness.

Upon stripping a child the following appearances should be noted: the surface of the skin should be mottled, the flesh firm, the skin elastic to the touch and smooth, never flabby, the legs and arms should move with freedom. The joints should be examined, whether large, small, or swollen. The respirations in a child from 1 to 3 years of age should be 24 to 36 per minute, and in their character diaphragmatic. The chest walls should not recede in an ordinary respiration. Eruptions should be looked for, especially round the anus. The stools of an infant should be yellow, and the motions passed three or four times a day.

The Teeth.—The first incisors should be present by the 7th month, the first molars by the 12th month, the canines by the 18th month, and second molars by the 20th.

The gums should be examined, whether hot, swollen, or otherwise.

A child seldom lifts its head from the pillow until about the 2nd month; it is unable to sit erect until the 4th or 5th month.

The Respirations.—In a child the respirations vary per minute from 30 to 50. The actual average in infancy is 39.

From 2 months to 2 years the respirations are about 35.

From 2 years to 6 years the respirations are, during sleep, 18; awake, 23.

From 6 years to 12 years the respirations are, during sleep, 18; awake, 23.

From 12 years to 15 years the respirations are, during sleep, 18; awake, 20.

Under 1 year the number of respirations per minute varies from 40 to 50.

When practicable both the front and back of the thorax should be examined; but the back of the chest in the sick child is the most important part to examine, and auscultation should be performed before percussion.

If the back presents no indications of bronchitis or pneumonia, it is very improbable that the front of the chest will show any.

Dulness posteriorly on the right side is a normal physiological state, due to abdominal pressure, by which the abdominal viscera, and, upon the right side especially, the liver, are pressed upwards.

The Expression of the Countenance.—The *lower* part of the face suffers chiefly in abdominal disorders, the cheeks are sunken and puckered, the lips are pale or livid.

The *middle* parts of the face are altered by lung and heart affections, the nostrils twitching, distended, or sharp. There are dark rings under the eyes, and a blue circle round the mouth.

The *upper* part of the face is mainly affected in cerebral diseases, producing contraction of the forehead, knitting of the brow, and purposeless, rolling, or fixed eyes. In addition to the above signs must be noted, pallor or redness, unequal dilatation of he pupils, and ptosis.

Gesture.—This is often of significance. In abdominal diseases the child draws up the legs, and picks at the clothes; the face is anxious and sunken.

In cerebral disease he puts the hand to the head, beats the air with uncertainty, rolls the head on the pillow, and pulls at his hair.

In severe dyspnœa the child clutches at its throat, or puts

the hand in the mouth, when the tongue is much furred, or when a false membrane is forming.

The Cry.—This varies. It is laboured or choking in capillary bronchitis or pneumonia. In brain disease it is sharp and shrill; characteristic in acute hydrocephalus (the "hydrocephalic cry"). In laryngitis it is metallic or brassy, and in tubercular peritonitis or marasmus it is wailing or moaning.

Crying for several hours always indicates one of two conditions—hunger or earache. A cry which precedes defæcation, or is accompanied by writhing and wriggling, is intestinal. A dry low peevish cry attending suppressed cough denotes pneumonia. A louder shrill cry upon coughing or in moving the child is an indication of pleurisy. Some authors recognise two events, the cry proper, or respiratory act, and the return which takes place during inspiration. The first is prolonged and sonorous, the second sharper and shorter. In young infants the return is feeble, but as the child grows older it increases. Towards the end of all diseases the return grows weak or entirely ceases. In diseases of the alimentary canal, moaning is highly characteristic. No tears are shed by children before the third or fourth month. The saliva also appears about the third month.

Posture.—In addition to the upright position of orthopnœa, the most noticeable position is the "*en chien de fusil*," the child lying on its side, the arms drawn close over the chest, and the legs flexed powerfully. This position is conspicuous in some cerebral diseases, and in the late stages of tubercular meningitis.

The Evacuations.—In health an infant's motions should vary in colour from light-yellow to greenish-yellow. Their reaction is always acid. The odour should be similar to that of sour milk; but it should never be offensive. Its consistency varies considerably within the limits of health.

The Tongue.—A red, hot, dry tongue indicates inflammation of the mouth and stomach. A furred tongue over which white curd is spread shows indigestion and intestinal irritation. Aphthæ, or thrush, may occur from neglect or starvation; white fur usually points to fever. A flabby, pale tongue, with marked edges, is an indication of great weakness. Yellow fur shows long-standing derangement of the stomach and liver. A brown tongue points to a low typhous state. In addition to the above must not be forgotten the so-called "strawberry" tongue of scarlatina.

Temperature.—Twenty-four hours after birth the average temperature is 100·4° Fahr., and 48 hours after it is about 98·6° Fahr. During the first few days of life it varies very little from the foregoing. At a later period, the average must be considered about 99° Fahr.; 98° to 99·5° Fahr. is perfectly normal. Some abnormal condition must be suspected when it is below 97° Fahr., or above 100° Fahr.

The temperature is a more reliable guide than the pulse in young children. The thermometer alone will indicate the suspicion of scarlet fever, or enteric fever, or some incipient pneumonia, or even worms. Rigors do not occur in young children, and in these subjects delirium and convulsions to a great extent correspond to the headache and rigors of the adult.

* There is a fall of temperature normally in the evening amounting to 1°, 2°, or even 3° Fahr. This fall may take place before sleep begins. It is usually greatest between 7 and 9 p.m. The minimum is at or about 2 a.m. After 2 a.m. it again rises, and that independently of food, etc., being taken; rises in fact during sleep. The fluctuations between breakfast and tea are usually trifling. The rise in a day to 104° or 105° Fahr. precludes typhus and typhoid, not scarlatina. In typhoid, a gradual increase for the first four

* Dr. Finlayson and Ellis.

days, with morning remissions, is diagnostic. In tubercle, the evening temperature is as high, or according to Dr. Ringer, higher than the morning. A steady fall of temperature towards the evening especially must be considered a very favourable indication in the continued fevers, and in inflammations generally, if the general condition of the patient corresponds. A fall of temperature with a rapid pulse, and aggravation of the symptoms, indicates danger from exhaustion. A sudden rise or fall of temperature always precedes death. A rise of a degree or two, viz., as high as 102° Fahr., is an indication of a moderate febrile attack, but a rise to 104° or 105° Fahr. shows a febrile or inflammatory condition of some danger, and a temperature of 107° to 110° must be considered in the highest degree dangerous. Recovery, however, is not impossible even when the highest temperature just indicated has been reached.

The Eye.—Strabismus, or squinting, is a serious symptom. It may result from paralysis, reflex irritation or convulsions, but after the subsidence of the convulsions, the squint may remain for a time or even permanently. When squinting is observed in acute hydrocephalus, this is almost always a fatal indication. A large pupil is more common than a small one. The latter occurs in sleep, in opium poisoning, and in cerebral congestion. The eye is always turned up to a greater or less extent beneath the upper lid. Inequality of the pupils occurring in acute disease is of grave import, but large pupils which are equal in size are only to be regarded as serious if they are insensible to light. The pupil has been seen to be irregular in children who are suffering from intestinal worms.

The Pulse.—This varies consistently with health from 110 to 150, and also consistently with health it may be irregular. It is somewhat slower during sleep, and after seven years of age it is rather quicker in the female than in the male. An

extremely slow pulse indicates brain disease; from 6 to 10 years the average is 84, and from 11 to 15 the average is 70.

TABLE OF THE PULSE ACCORDING TO MULLER.

At birth	130 to 140
1st year	115 to 130
2nd ,, ...	100 to 115
3rd ,, ...	90 to 100
7th ,, ...	85 to 90
14th ,, ...	80 to 85

In conclusion, the following facts should be borne in mind :—

In early childhood the intensity of the symptoms bears no relation to the existing affection.

Very intense fever with restlessness, screaming, and convulsions, may pass off in 24 hours, not leaving the least trace.

Copious perspiration is never seen in young children; moisture entirely replaces it.

Fever in the acute diseases of young children always exhibits considerable remissions.

Fever is almost always intermittent in the chronic diseases of infancy.

During sleep the pulse of a child falls from 15 to 20 pulsations.

The pulse may be raised 15, 30, or even 40 pulsations, by the muscular movements which accompany convulsions, cough, or crying.

During the first weeks of life a child grows most rapidly, viz. :—

In the 1st year it should grow from 6 to 7 inches.

From the 4th to the 16th year, it should grow yearly about 2 inches.

From the 16th to the 17th year, about 1½ inches.

From the 17th to the 20th year, about 1 inch.

Growth is retarded by disease of the bones, scrofula, and rickets.

A child should be able to run alone about the end of one year; if it has begun to walk, and it chiefly uses its toes, its gait is limping, and particularly if pain is complained of in one knee, or the limb is tender to handle, incipient disease of the hip must be suspected.

CHAPTER I.

DISEASES OF THE DIGESTIVE ORGANS.

EVEN in the youngest infants the gastro-intestinal mucous membrane is particularly subject to disease, being often inflamed and easily irritated; but, on the other hand, a condition of relaxation or debility is sometimes present.

The whole tract of the mucous membrane may be involved, but in the majority of cases one part only is affected—such as that of the mouth or the stomach; frequently two or more portions are simultaneously affected, since gastro-enteritis is much more often observed than simple gastritis. The small intestines are far more liable to be attacked than the other portions of the intestinal tract.

Different structures may separately be the seat of disease, as the mucous or serous membranes, or simply the mucous glands. Thus according to its seat or the nature of the affection will the name of the disease vary. Inflammatory affections very commonly occur; and the inflammation may be merely erythematous, or may be followed by ulceration, exudation, softening, or gangrene.

Although the ulceration may be of a common variety, it is more usually aphthous in character; exudation may result from this ulceration, or take place independently of it, and in the child there is a peculiar tendency to the formation of such depositions.

Exudations upon the mucous membranes present distinct features, being white or soft, and composed of the crusts of aphthous ulceration, or made up of a secretion like milk or curd; or the exudation may be tenacious and firm, consisting of an effusion of lymph.

All these affections of the mucous membrane may be observed particularly in the mouths of children, and many of them in any part of the intestinal tract.

Some are especially liable to occur in certain localities, as aphthous ulceration in the mouth, exudation in the pharynx and fauces, and follicular ulceration in the ileum; a few are extremely rare in any part. In children from the earliest age the mucous membrane of the mouth exhibits a disposition to disease, and may be observed in a state of congestion at birth, or of inflammation very soon after. Ulceration, or exudation, is commonly met with; these are always dangerous indications, even in mild cases, since they are liable to spread, involving the air-passages, or passing into the digestive canal.

Even in severe cases, whilst the disease is limited to the mouth, and the infant is young, little constitutional disturbance arises; as a rule, however, these affections are seldom localised, but are in general associated with intestinal or gastric diseases, or are sympathetic of such diseases. Thus, constitutional treatment must never be lost sight of, and especially must the state of the bowels be regarded. Local treatment is nevertheless of great importance, in consequence of the tendency of these affections to spread.

DISEASES OF THE MOUTH AND FAUCES.

Stomatitis,

Or inflammation of the mucous membrane of the mouth, is a common disease among children, especially during dentition, but it may take place at almost any age. It may be caused by cold, irritating or indigestible food, and by too frequent use of the sucking-bottle; or it may be an indication of a like state of the stomach or other part of the intestinal tract.

In some cases the inflammation produces small circular, painful ulcers, having a depressed centre surrounded by a red margin; in others the gums and mucous membrane are affected by deep ulceration; and in a third class the cheek may be attacked by swelling and gangrene, and a fatal result ensue. The symptoms are, redness and heat of the lining membrane of the mouth, of greater or less extent and intensity, accompanied by minute, white, isolated spots of ulceration. The mouth and tongue are often dry, the lips may be swollen and excoriated, or covered by an eruption; when the disease is protracted, and the infant only a few months old, the flow of saliva may be profuse. There are rarely, however, any appreciable fever symptoms, unless the infant has arrived at the fifth or sixth month.

Stomatitis Simplex,

Or inflammation of the mouth, slight and without complication, is unaccompanied by danger, and is usually curable by mild emollient applications, such as decoction of barley, and mucilage of gum; or by a linctus composed of equal parts of mucilage of gum, white of egg, and simple syrup; a small quantity of chlorate of potash may also be exhibited. The state of the bowels must, however, at the same time be

looked to, and any source of irritation, as in the mode of feeding or in the character of the food, must be removed.

Stomatitis Ulcerativa, Ulcerous Stomatitis, Noma,

Or inflammation of the mouth with ulceration, may result from intense or protracted inflammation, particularly in mismanaged children, or those placed in unfavourable situations, and in whom the general health has become deteriorated. It usually occurs about the period of the first dentition.

The common ulcer is generally large and irregular, being coated with a white or yellowish slough, and surrounded by considerable redness. There are seldom many ulcers; they are often single, are seated on the roof of the mouth, the inside of the cheek, or are found on the tongue. Very acute ulceration of the gums is sometimes observed in infants at the breast, but this rarely happens after the first year. The gums are spongy, vascular, and of a purple colour, and the ulceration is frequently deep, inclined to bleed, and becoming of a greenish or ashy hue. It has, however, no liability to slough.

These ulcerations of the mouth are usually accompanied by considerable local irritation. The fever occasionally runs high, and the digestive organs are in particular deranged.

In a mild case the ulcerated surface may be touched with a little borax or alum dissolved in a little honey (gr. v. to ʒj); at the same time the bowels should be regulated, light nutritious food provided, and plenty of fresh air allowed. A more severe case may require the local application of nitrate of silver, or of sulphate of copper; ten grains of this latter salt being recently dissolved in an ounce of honey may be applied with a camel-hair brush two or three times a day.

In protracted cases tonics are of service, and diffusible

stimulants, as ammonia, must be given if the strength of the patient begins to suffer

Aphthæ or Thrush

Is a very common affection in young infants, and is characterised by the presence of a number of white, curd-like spots covering the mucous membrane of the mouth, and being most abundant upon the tongue, fauces, and inner surface of the cheeks. The spots frequently coalesce to form a continuous layer, which may appear like a false membrane; the whole, however, may be easily removed by a sponge, since there is no adhesion to the underlying surface, as in the case of the diphtheritic membrane. The child is usually peevish and fretful, his mouth hot, and the salivary flow is diminished.

Thrush is almost always connected with derangements of the digestive organs; it is, in consequence, most frequently seen in artificially-fed children, in whom the food, not being properly digested, produces irritation of the stomach and bowels, the motions becoming green and offensive. The disease will show itself in the mouths of children sympathetically with disorder of the intestinal canal, which is affected in a similar manner. In advanced gastro-intestinal diseases, aphthæ may extend from the stomach to the mouth, or coexist simultaneously in two distant parts, being present at the margins of the anus and also inside the lips, although it by no means follows that the disease occupies the whole tract of the intestines. When far back in the mouth and occurring in delicate children, aphthæ may spread into the œsophagus or air-passages; at times the disease appears to extend epidemically, and it may be contracted by contact, since true aphthæ have been communicated by merely kissing the lips of an aphthous infant. It has been asserted

that the white specks always contain cryptogamic growths, viz., the *Oidium Albicans* and *Leptothrix Buccalis*.

The growth of these would seem to be favoured by disturbances of the digestion, inflammation of the mouth, and acid secretions. Most cases end favourably, but occasionally the attack is very severe, and is attended with considerable danger. The treatment must be directed to the constitutional condition. Attention must be paid to the state of the stomach and bowels, and great cleanliness observed regarding all the articles employed in the feeding of the infant.

Castor-oil, powdered rhubarb and magnesia, and hypophosphite of soda, with a little hydrargyrum cum creta, may be given internally, and locally solution of borax or of alum may be applied. The Mel Boracis of the pharmacopœia is probably the best application. If the aphthæ are few and very irritable, they may be lightly touched with nitrate of silver.

Cancrum Oris

Is a rare and most fatal disease. It is most liable to occur in children from two to five years of age, although it may be seen up to the age of twelve years, and may follow debility resulting from a long illness, especially fever.

There is fetid breath, offensive saliva is discharged, and a hard, shining red swelling appears in one cheek, very tense, but painless. Internal to the swelling is seen an excavated, unhealthy, jagged ulcer, which is coated by a brown slough. The discharge from this ulcer is intensely putrid, the gums become involved, the teeth loosen, the surrounding tissues are destroyed and cavities formed, and necrosis of the jaws may follow.

The only treatment to be relied on is the careful application of strong nitric acid or hydrochloric acid. The

mouth should be constantly washed with a weak solution of chlorinated soda, Condy's fluid, or some other disinfectant.

Chlorate of potash, ferruginous preparations, and castor-oil may be exhibited internally.

Pharyngitis Catarrhalis,

Or inflammatory sore throat, is more frequently observed in adults, but some children are specially subject to it. The mucous membrane of the tonsils, soft palate, and pharynx is swollen and red, and covered by muco- or sero-purulent secretion.

There are usually some feverish symptoms, accompanied by loss of appetite, thirst, difficulty of swallowing, dryness and heat of the throat, the voice becoming husky and hoarse.

In strumous children the cervical glands are often found enlarged.

This disease is usually caused by exposure to wet and cold, but appears at times to be connected with stomach derangement.

Pharyngitis frequently accompanies measles, scarlet fever, bronchitis, pneumonia, and laryngitis. It is usually a mild affection, and only dangerous from complications. The treatment should consist in placing the patient in a warm room, the atmosphere being rendered moist by the use of the steam-kettle.

Internally, drop doses of tincture of aconite may be given, combined with chlorate of potash; sometimes good may be derived by mopping out the pharynx with a weak solution of nitrate of silver.

In strumous subjects, or when the pharyngitis becomes chronic, the throat may be painted with glycerine of tannin

and perchloride of iron, the internal remedies being the syrup of the iodide of iron and cod-liver oil; enlarged glands should be rubbed gently with the ointment of the iodide of lead.

Retro-pharyngeal Abscess

Is a condition in which matter is found between the posterior wall of the pharynx and the vertebral column. It occurs most frequently in infants and in early life. Strumous and tuberculous children are specially liable to it, but it may be caused by caries of the cervical vertebræ, and may follow measles and scarlatina. It has also been traced to inflammatory lymphatic glands situated between the vertebræ and the pharynx. The symptoms are exceedingly insidious, and usually consist in general fever, dysphagia, and inability to assume the recumbent posture. There may be pain in moving the head, and stiffness of the neck. With the advance of the disease the respiration becomes laboured, and swallowing gives pain. A peculiar croupy inspiration is occasionally present.

Upon examination of the fauces and pharynx the abscess may be seen pushing the posterior wall of the pharynx against the velum pendulum palati; or, if situated lower down, causing obstruction in the larynx, and impeding respiration.

In some cases the pus may even extend into the pleural cavity and cause dangerous lesions within the thoracic walls.

Upon detecting the abscess, it should be opened at once in the median line, and for a few days afterwards the tumour should be pressed to dislodge any accumulated matter. In successful cases recovery usually takes place in a few weeks, and most cases end favourably when the abscess is detected and opened early. Cases due to disease of the spinal column are usually fatal.

The internal remedies are tonics and analeptics, such as the iodide of iron, quinine, pure air, and nourishing diet.

Parotitis,

Inflammation of the Parotid Gland, or Mumps, is a common and acute contagious disease among children. One or both of the parotids may be affected. It generally occurs but once during a lifetime, and is most frequently met with at about five years of age. The symptoms are slight feverishness, followed by considerable pain and swelling about the angle of the jaw. The swelling is somewhat hard, often extending from beneath the ear down the neck to the chin, and pain is occasioned by articulating, mastication, or swallowing.

Parotitis, when not contagious, may be caused by cold, or may follow typhus and other fevers, and in the latter case may be followed by suppuration. It generally occurs as an epidemic, and usually reaches its height in three or four days, gradually declining in severity and disappearing, or a metastasis taking place, either to the brain, when it is exceedingly dangerous, showing itself in delirium or coma, and ending fatally in a few hours; or the mammæ of girls or the testes of boys may be attacked, these parts becoming very painful and swollen.

Virchow is of opinion that the affection begins in the gland-ducts, and not in the interstitial tissue of the parotid.

Warm fomentations and flannel round the chin are usually beneficial, but when there is much swelling a few leeches may be applied, followed by a poultice.

Mild saline aperients may be exhibited internally, and the diet should be entirely fluid, consisting of tea, thin arrow-root, and milk.

Tonsillitis Acuta,

Acute Inflammation of the Tonsils, or Quinsy, is a comparatively rare affection in children, and, indeed, is seldom observed before the age of five years; but when it does occur it presents much the same features as in the adult, being characterised by febrile symptoms, rigors, pains in the back and limbs, and followed by dryness and heat in the throat. Swallowing is very painful, the voice is guttural and husky, and the tongue is covered with thick creamy-white fur. There is generally a deep pink hue of the pharynx, and one or both tonsils are swollen; usually only one tonsil is affected. The uvula is generally swollen and œdematous, and there is often a sensation of pain darting along the Eustachian tube to the ear; the saliva is freely discharged, fluids returning through the nose.

In children quinsy usually ends in resolution, and not in suppuration, as is the case with adults. The more common result, however, is in

Tonsillitis Chronica,

Or Hypertrophy of the Tonsils. This affection may follow the acute form, but this is by no means usually the case. It is of frequent occurrence in anæmic, strumous, or rickety children, or in those who are tainted with syphilis. It may commence during the first three years of life, and is specially prevalent from five to ten years of age. The tonsils extend into the middle of the fauces, the faucial opening becoming narrowed, and swallowing and speaking are embarrassed. Patients so affected snore heavily, and sleep with the mouth open; they are particularly susceptible to cold, deafness, and spasmodic fits of coughing. It is stated that children who are the subjects of enlarged tonsils which nearly meet, and thus impede the entrance of air to the lungs, frequently

present cup-shaped depressions in the lower part of the chest, these depressions disappearing after the tonsils have been removed by excision. The so-called pigeon-breast may also follow hypertrophied tonsils.

Treatment.—With regard to the treatment of quinsy: before the formation of matter, scarification of the tonsils may relieve the tension, the mouth may be frequently washed out with warm water, and should there be great pain in separating the jaws, a few leeches may be applied, with the subsequent addition of a poultice. Amongst the internal remedies may be mentioned an emetic to anticipate the attack, or the inhalation of a medicated vapour, such as that of pinus sylvestris, or tincture of benzoin, or the use of an astringent gargle. Inhalation of steam is of great service. The effect of aconite is often remarkable, and the tincture in drop doses may be given every hour. Guaiacum is held in much esteem by some physicians.

The bowels should be gently moved, and chlorate of potash is a very valuable drug, both given internally and as a wash for the mouth. After the bursting of the abscess, which, however, as before mentioned, is rare in children, port wine is the appropriate stimulant.

The treatment of hypertrophy of the tonsils should consist in the local application of nitrate of silver, glycerine of tannin, perchloride of iron, or tincture of iodine; the injection of ergot and iodine into the mass of the tonsils has met with fair success. In many cases no plan succeeds except removal of the gland or glands, but this operation should rarely be performed under the age of five years, reliance being placed upon the internal administration of tonics, as the preparations of iron, and cod-liver oil.

CHAPTER II.

DISORDERS OF THE STOMACH AND BOWELS.

Children are peculiarly liable to disorders of the stomach and bowels; and these disorders may arise merely from functional derangement, as is observed in some varieties of diarrhœa, cholera, etc., or they may be caused by some inflammatory action, which leads to organic changes. The functional disturbances may be purely sympathetic, being due to sympathy with some other organ which is diseased; but they are most frequently set up by improper feeding. Derangements of the digestive organs, however originating, rapidly tend to produce diseased action in the affected parts; this irritation may give rise to inflammation, although not necessarily. These functional disturbances may be sufficiently severe in some cases to lead to a fatal result, and after death no signs of inflammatory action and no trace of organic disease will be discovered, but such instances are, I believe, very rare.

To distinguish the inflammatory from the non-inflammatory cases is a matter of great importance, and often of difficulty; it is only by paying careful attention to a group of symptoms, and not to any one symptom in particular, that a true distinction between these conditions can be drawn.

Symptoms of inflammation may arise during the course of an affection not originally or necessarily inflammatory, as may occur in intermittent fever, prolonged diarrhœa, and in the cholera of infants; but, on the other hand, a condition of irritability dependent upon debility may occasionally succeed true inflammation, as in enteritis.

The stomach and bowels of children are frequently the seats of inflammatory affections. These affections may arise from cold or damp, being especially influenced by season, as is seen in the constant bowel complaints of children during autumn. Again, inflammation may follow continued and severe irritation of the mucous membrane, arising from improper feeding; or it may be symptomatic of some existing disorder. The inflammation in some cases may be limited to the stomach, but it more usually spreads further, involving to a greater or less extent the mucous membrane of the small intestines, and constituting gastro-enteritis. The lower part of the ileum is a frequent and special seat of inflammation, or the large intestines may be implicated, dysentery being produced.

Disorganisation of the mucous membrane soon follows inflammatory action, softening or ulceration being set up, but death may take place before these conditions occur, the mucous membrane appearing simply reddened or injected.

When softening has followed inflammation, the membrane easily peels off in soft reddish masses; but in another form of this affection the softened membrane is white, and is independent of inflammatory action.

When ulceration takes place, its seat is in the muciparous follicles or glands, and it is then analogous to the aphthous affection of the mouth, and is, in fact, often combined with that disease. Serious symptoms may, however, follow excitement of the muciparous glands, quite apart from actual inflammation or ulceration.

Intense inflammation of the mucous membrane of the stomach, but more generally of the ileum, may in some instances lead to gangrene of those parts. Perforation of the intestines has thus taken place and produced peritonitis, but this result is more often caused by follicular ulceration. When the lower portion of the intestinal canal is the seat of

much irritation or inflammation, the passage of the stools may be attended by pain and straining, or prolapse of the anus may be occasioned. Congestion or inflammation of the mucous membrane may at times set up hæmorrhage of a severe character.

Inflammatory affections of the bowels are often attended by severe fever symptoms, and if the child be somewhat grown, and the attack of recent date, the local symptoms are particularly marked. Thus in many instances the nature of the case is undoubted; but when the infant is very young, the onset of the complaint and its advance may be very insidious, extensive organic alteration being occasioned before the true character of the case is even suspected.

The accompanying fever is usually of a remittent type, and infantile remittent fever is now admitted to be connected with intestinal irritation, having its origin either in worms, undigested food, or other extraneous matters, or by a morbid state of the mucous membrane. It is a matter of extreme importance, in reference to treatment, to examine carefully the sources of this disorder. Acute and chronic diseases of the digestive organs may also give rise to sympathetic disturbances of the head, chest, or skin.

FUNCTIONAL DISORDERS OF THE DIGESTIVE ORGANS.

Infantile Indigestion

May result from the food being unsuited in quality to supply the necessary nourishment, as occurs with infants at the breast who are not provided with wholesome milk; or the food may be unfit to undergo the process of digestion, as happens with children who are fed improperly or too soon. Thus two varieties may be recognised, viz., the Indigestion of Suckling and the Indigestion of Weaning.

1. *The Indigestion of Suckling.*—The infant becomes pale and emaciated, and his flesh loses its firmness; he is fretful and peevish, constantly crying for the breast, and sucking greedily, but the food always disagrees, being rapidly thrown up from the stomach or passed by the bowels in a curdled state. Flatulence and griping are constant accompaniments, and the child may sink in a few weeks from protracted diarrhœa. The infant absolutely dies from starvation, for, although he takes large quantities of nourishment, this is never assimilated. In some cases the stomach and bowels become irritated and inflamed, but in others no inflammatory action is apparent after death, and the mucous membrane is found in a state of white softening.

These conditions may be caused by the nurses who suckle the infants being out of health, or their milk being too old for the infant, or, when the child is brought up by hand, by the fact of the feeding-bottles being carelessly washed. The *Treatment* must specially consist in removing the cause, a good healthy nurse being procured, or in the substitution of a good mode of artificial feeding.

Purging may be arrested by small doses of hydrargyrum cum creta, and a little soda, rhubarb, magnesia, or bismuth; in some cases a mixture of chalk and the ammonio-citrate of iron does good, and the careful administration of weak chicken broth may sometimes prove beneficial.

2. *Indigestion of Weaning.*—Indigestion is specially liable to occur at the period of weaning, in consequence of the extreme sensibility and vascularity of the intestinal mucous membrane of the infant. If the food be of improper quality, or in too great quantity, more or less fever, sickness, and purging are occasioned, flatulence, pain, and spasms are present, and sufficient sympathetic irritation may be excited to produce convulsions. The stools may be very yellow in colour, but are more often deep grass-green ("the green scour"), and

of an intensely fetid odour; at the same time the vomited matters are usually yellow or green. Short periods of constipation may sometimes intervene. In this case the biliary secretion is much increased, but in other cases this secretion is suppressed, the stools being clay-coloured, thick, or thin and watery. If this state of things remains unchecked, rapid emaciation follows, the belly becomes swollen, and constant vomiting and diarrhœa are established. Death may take place from the mere functional disorder, and the intestines will be found empty, transparent, and pale, in some parts contracted as if by spasm, in others inflated with gas; or intus-susception may be observed, but no signs of inflammation are present. In other cases intestinal ulcerations may be observed. Sometimes the cases may resemble cholera, and will end fatally in a week or a fortnight. Coma and convulsions are then usually present, and after death venous congestion, with effusion into the ventricles of the brain, will be found.

As regards *Treatment*, the chief point is to remove the cause, and it is marvellous how an ill-fed infant may, by judicious management, sometimes recover from extreme exhaustion.

The diet should consist of asses' milk, weak broth, thin barley-water, with isinglass or gum dissolved in it. The milk should be previously boiled and diluted with one part of water. The addition of lime and magnesia to the milk is often advantageous.

The suitable remedies in many cases are antacids, as soda, or magnesia with rhubarb; and, if the stomach has lost tone, a bitter tonic, as calumba, may be added.

In other cases the mineral acids are very useful, as the diluted hydrochloric or nitric acids in small doses, or a combination of these two acids.

The salts of bismuth are very valuable in allaying irritation

and checking vomiting. They may be sometimes combined with a few drops of diluted hydrocyanic acid.

The indigestion or dyspepsia of children who have passed the period of infancy presents much the same symptoms as in the adult, being chiefly indicated by pain in the stomach after food, a sensation of distension, and the passage of wind; the tongue is usually furred, and headache and slight feverishness may be present.

In children, however, night-terrors and startings in sleep are not uncommonly superadded, but these results are often symptomatic of worms.

The same *Treatment* is applicable as in the case of adults, and should consist in the administration of acid or alkaline remedies, according to the exact nature of each case.

If any worms be present, they should be encountered by some suitable vermifuge. In older children the dyspepsia is frequently associated with anæmia, in which case the preparations of iron combined with quinine or some other tonic are the appropriate remedies.

Cholera Infantum,

or Gastro-Intestinal Catarrh, is a very formidable disease, and is especially met with in the autumn season, commencing at the end of the summer. It often occurs in infants at the breast, chiefly during dentition, or in the recently weaned.

The disease may be gradual in development and slow in progress, or its invasion may be sudden and violent.

It usually commences with simple diarrhœa, griping pain in the stomach and bowels, loss of appetite and fretfulness, followed by purging, prostration, and symptoms of collapse; severe vomiting may sometimes be present. The pulse is small and quick, the tongue moist and of a white or bluish tint, and feeling cold. The stools are at first thin, fæcal, or frothy, with altered bile or mucus, frequently green and in-

tensely fetid, as if filled with chopped vegetables, followed by copious evacuations like rice-water, with shreds of membrane, and often described as running from the child like water; but they now contain no trace of bile, and are white or yellow in colour. The belly is swollen or tympanitic, but not tender to pressure; much sensibility of skin is present.

In extreme cases the infant may sink in twenty-four or forty-eight hours, but in milder cases remissions may occur, the child being feverish and restless, with evening exacerbations; occasionally purging is absent, but recurs, emaciation proceeding rapidly; at last an acute attack destroys the child, or it gradually sinks in three or four weeks.

Recovery will, however, often take place, notwithstanding that the child is extremely reduced, if the evacuations can be checked and the strength supported; but if the disease is protracted, organic changes taking place, and the strength much exhausted, the prognosis is most unfavourable.

This disease is evidently a species of cholera, and is not necessarily due to inflammatory action, although somewhat similar symptoms may arise from an insidious form of intestinal inflammation, frequently terminating in ulceration. On dissection the mucous membrane of the stomach and bowels has been found in a state of softening, or reduced to a disorganised pulp, without any decided trace of inflammation. Occasionally, however, in portions of the intestinal mucous membrane, some redness has been observed. The mucous membrane is usually colourless and pale, the intestines being almost transparent, and as if macerated in water. The mucous follicles are natural.

The *Treatment* to be adopted is the same in principle as that of the indigestion of weaning, but the measures must be very prompt. Immediate efforts should be made to arrest the purging and vomiting. The strength should be sup-

ported and stimulants given if necessary. Port wine may be given with arrowroot, and brandy and water, or a little burnt brandy, will be found serviceable. Warm applications, friction, sinapisms, or liniments may be necessary, and the internal remedies should consist of catechu, or kino, with spirits of ammonia, or spirit of chloroform. The ammonio-citrate of iron and chalk will be found valuable; after recovery from cholera infantum, even though the bowels continue long confined, purgatives should be carefully avoided.

Diarrhœa.

The forms of bowel complaints previously described appertain particularly to the period of infancy, and arise especially from indigestion or stomach disturbance. We will now consider diarrhœa as more intimately connected with intestinal derangement, and taking place at any period of childhood. Indeed, it is the disease to which the child is most subject. Some authors regard diarrhœa as merely a symptom of organic disease, but it cannot be doubted that in many cases no organic lesion can be discovered after death, and that functional diarrhœa may continue long enough to destroy life. Normally a child during the twenty-four hours should pass from three to six motions, the form of which is pappy, the colour deep yellow, the consistency that of thick gruel, and the odour feebly acid, never putrid. It must be remembered, however, that the departure from this standard may be considerable, and yet not inconsistent with health. Slight diarrhœa during dentition is often rather beneficial.

An increase in the frequency and abundance of the evacuations from the bowels of the child is speedily caused by any source of irritation. The biliary secretion is soon disturbed, the watery and mucous excretions copiously thrown out. The irritation is carried to the muscular fibre,

and peristaltic action increased, the stools being expelled with greater force in addition to their frequency. There is usually some sickness, although not always, and the appetite is variable and capricious; the tongue is coated white or yellow, its sides and tip occasionally red. Acidity, griping, and flatulence are nearly always present, and there is heat of the skin, especially that covering the abdomen.

The above conditions are certain to be found, sooner or later, in an overfed child, or in one in whom the use of unwholesome food is long continued.

Diarrhœa is often set up in children by cold, the prevalence of fever, or the retrocession of eruptive ailments.

Various forms of diarrhœa are described, viz. :—

Simple, Bilious, Mucous, Thermic, Lienteric, and Dysenteric.

It is also divided into Acute and Chronic forms.

In *Acute* forms of diarrhœa the symptoms are from the beginning active, and seldom continue for more than a week or fourteen days, the inflammatory products being thrown off from the intestines. The *Chronic* forms of diarrhœa may continue even for months. The bowels act incessantly, and flesh and strength are gradually lost.

1. *Simple Diarrhœa.*—In this form the stools are frequent, copious, and relaxed, and squirted out with spasmodic effort, the child soon becoming exhausted. The evacuations are greenish, slimy, and fæcal. There may be sickness and thirst; the child becomes much weakened; the abdomen may be swollen with wind, and tender. Prolapse of the anus may take place if the diarrhœa is severe and protracted. Even when this malady terminates fatally, as it does in some cases, no pathological changes are discernible.

2. *Bilious Diarrhœa* may occur in children who eat more animal food than necessary. Irritation of the intestines is set up by the large amount of bile secreted by the liver and poured into them. It most frequently occurs in hot weather

and in tropical climates, in which it is a common complaint, since the liver is so prone to congestion in hot countries. The stools are loose, copious, and dark yellow or green in colour. The urine may also contain bile.

3. *Mucous Diarrhœa*, or *Muco-Enteritis*, is of an inflammatory nature. The constitutional disturbance is considerable. Much thin mucus is present in the stools, which afterwards become thicker, and present the colour of pus. The motions are not copious or frequent, and they vary in colour, being sometimes yellow and mixed with mucus, at other times offensive and yellowish, resembling chopped spinach. Tenesmus is a frequent symptom, and the fæcal matters may be mixed with mucus and blood. This disease may be caused by cold or damp and alternations of temperature, and by errors in diet.

This form of diarrhœa may follow measles, pertussis, typhoid fever, or pneumonia. Feeble and strumous children are very liable to attacks of muco-enteritis. A simple diarrhœa passing into this form may result from the abuse of opening medicine. Post-mortem examination reveals disease of the small and large intestines; the lower parts of the ileum in the small intestine are chiefly affected, in the large the descending colon and sigmoid flexure.

4. *Thermic* or *Heat Diarrhœa* is especially observed in hot climates, but may occur in the summer. The pulse and respirations are rapid; there is frequent purging of greenish semi-fluid, watery, fæcal, and half-digested matters. Thirst is intense, the eyes staring, the pupils contracted. This form is relieved by the cold bath, the temperature of which should at first be 75° Fahr.; the legs and feet being first immersed, and water then poured over the body until the whole is covered by water. Colder water, at 65° Fahr., is then poured over the head in a continuous stream. After removal from the bath the child should be wrapped in a woollen shawl, and placed in

bed. The internal treatment should consist of beef-tea, lime-water, and milk. In these cases, quinine in doses of $1\frac{1}{2}$ grains will be well borne by children between the ages of eight and sixteen months.

5. *Lienteric Diarrhœa* or *Lientery*, is characterised by the passage of undigested food through the bowels, and frequently occurs in children who have been reared artificially, and who are the subjects of mesenteric disease. The food undergoes hardly any change in passing through the alimentary canal. The appetite of the child is ravenous and never satisfied, and great debility and emaciation result from the non-absorption of the food.

6. *Dysenteric Diarrhœa* is characterised by excessive discharge of mucus and blood from the bowels, unattended by fever. The intestinal vessels become intensely congested, and finally rupture. The discharges are feculent; and there are tenesmus, wasting, and pain.

Chronic Diarrhœa often results from the acute forms, or may be caused by cold or over-feeding, or the use of sour milk. A condition of chronic irritation and catarrh is set up. The motions are at times copious, at others thin and slimy, and may contain mucus streaked with blood.

In the majority of cases diarrhœa is caused by unsuitable food, as may be illustrated by the habit of giving biscuits and farinaceous food to young children, intestinal irritation being set up, and the offending matters eliminated. Diarrhœa is easily produced if the feeding-bottles are not properly cleansed, since then the milk turns sour, and it may also be induced by the milk of unhealthy nurses. Bad air, impure water, and filth, are also considered causes; and at the time of weaning very troublesome diarrhœa often occurs. A sudden change of diet may sometimes set it up.

Diarrhœa often follows measles and whooping-cough, and it is sometimes connected with rickets.

The injudicious administration of aperient drugs is another cause.

The Treatment of diarrhœa must in a great measure depend upon its causation. Very careful attention must be paid to the diet.

The age of the child and its constitution must be regarded, and particular notice should be paid to the gradual or sudden nature of its illness. Before the appearance of teeth, milk in some form must be relied upon, and all farinaceous food must be forbidden; a small quantity of lime-water is a useful addition to the milk.

Simple diarrhœa, resulting from irritation of the lining membrane of the bowels, must not be too hastily checked, since by this means nature eliminates the offending matters; but if the diarrhœa continues, it must be checked by such remedies as castor oil or rhubarb, soda, and magnesia. In older children grey powder with Dover's powder will be useful, or the administration of a little bismuth. As a rule, it is a mistake to give astringents at an early stage of diarrhœa; the best plan being first to eliminate the offending matters, and subsequently to check the diarrhœa if it prove excessive.

If the child is strong, the motions containing blood or mucus, and there is no pain in the abdomen, a mixture of tincture of rhubarb, sulphate of magnesia, and peppermint water may prove serviceable. If there be much exhaustion, a few drops of brandy may be given in weak milk or arrowroot.

For the treatment of bilious diarrhœa, alkalies, especially soda, may be combined with one or two minims of tincture of opium; but this last drug must be administered with the greatest caution in the case of very young children.

CHAPTER III.

INFLAMMATORY AFFECTIONS OF THE DIGESTIVE ORGANS.

VERY young infants are liable to inflammatory affections of the abdomen, which are perhaps more common in children under six months old. The symptoms are chiefly local, and frequently obscure; the constitutional fever is slight, and the pulse is seldom affected. When, however, we meet with a full tense belly, which is tender to the touch, in a child who is lying on its back or side, with the legs drawn up, and suffering from purging and vomiting, there is little doubt that we have to deal with intestinal inflammation; and all doubt is removed if, in addition to these symptoms, the skin over the abdomen is very hot, the tongue dry, red, and parched, and the anus surrounded by erythematous redness.

The older the child is, the more marked is the fever, and the character of the symptoms will vary according to the seat of the inflammation, whether seated in the stomach or in some particular tract of the intestines or according as the inflammation merely affects the mucous membrane, or involves an affection of the mucous glands.

When acute febrile symptoms are present they often soon cease, and are followed by those of sinking, the strength being much prostrated, the skin livid and cool, the belly losing its tenderness, but continuing tympanitic.

The purging may entirely cease, and symptoms of cerebral congestion or convulsions arise.

Gastritis,

Or Inflammation of the Stomach, is rare in children, and its symptoms are obscure; but when it does occur, it is usually accompanied by inflammation of the bowels. Vomiting is a constant symptom, and the pain, when present, is usually of a paroxysmal character. There may be either diarrhœa or constipation, accompanied by tympanites, thirst, and fever. There is always some tenderness over the epigastrium.

Irritant poisons will, of course, produce gastritis, but, apart from these agents, the chief cause would appear to be improper feeding.

Inflammation of the stomach may also occur during the course of a fever, or it may follow stomatitis.

By far the most common form of this affection is

Subacute Gastritis,

The symptoms of which are those of severe dyspepsia—viz., loss of appetite or craving for food, with pain after the reception of food; vomiting is sometimes present, and there is tenderness over the epigastrium; the motions are frequently green and offensive, and the child gradually loses strength and flesh.

The treatment of gastritis will chiefly depend upon the cause, and will consist in the administration of cold water and sedatives, the diet being carefully regulated. Milk and lime-water will be very serviceable.

In subacute gastritis a bland and non-irritating diet must be given, and diluted prussic acid and bicarbonate of potash may be exhibited. Calomel or grey powder will be found useful in allaying any irritability of the stomach that may be present.

Enteritis,

Or Inflammation of the Small Intestines, is a far more frequent affection than gastritis; and, although it may exist independently of the latter affection, the two are usually combined, forming gastro-enteritis.

In enteritis the abdominal tenderness is situated lower down, is more diffused, and frequently not so acute as in gastritis. The skin is uniformly dry and hot, especially over the abdomen, which rapidly becomes tense or tympanitic. The legs are drawn up, and the face is expressive of great distress. There is great thirst, and a preference for hot drinks is frequently shown.

The pulse is rarely quickened in very young infants, and seldom so even in those over six months old. Vomiting is often present, although not so frequently as in gastritis, and it does not occur immediately after taking food. The vomited matters are frequently yellow and occasionally fæcal. The state of the bowels varies.

The stools may be natural, but are usually depraved. There may be constipation, but generally diarrhœa is present, the fæces are thin and frothy, and of a yellow or green colour. The tongue may be neither red nor dry, and the stomach is undisturbed; but if enteritis is combined with gastritis, symptoms characteristic of the latter affection are associated with those peculiar to enteritis.

The causes of enteritis are the same as those which produce gastritis; and the treatment of the affection is also similar.

Colitis, or Dysentery,

Is very rare in young children, although it does sometimes occur. The acute form is usually characterised by violent vomiting, pallor, and shivering. The motions at first are copious and bilious in their nature, becoming by degrees scanty and slimy, containing glairy mucus, like white of egg, and mixed with blood. The blood is generally mixed with fæcal matter, at times escaping in lumps and accompanied by griping pain in the abdomen, difficulty of micturition and tenesmus.

In chronic forms the sufferer becomes thin and restless, and the discharges from the bowels are mixed with blood and pus, the motions being very offensive, acrid, and containing pieces of lymph.

Flesh and strength are gradually lost, and there is constant nausea, thirst, and loss of appetite. In favourable cases the stools become less frequent, blood no longer appearing in them, the restlessness and feverishness cease, and the appetite returns.

Colitis is most common in the hot months of the summer, and may be set up by eating unripe fruits; but it may also be occasioned by improper feeding, impure water, cold and damp.

Pathologically, in the acute stage of the disease the morbid changes appear in the large intestine and rectum; sometimes the small intestines are involved, their mucous membrane being swollen, soft, and presenting red patches through its whole length. In parts it may be even dark or gangrenous. In the chronic stage minute round specks of ulceration are observed; these eventually coalesce, and produce an uneven ragged appearance of variable depth and extent. If the case is of long standing the ulcers may contract, and become surrounded by hardened tissue.

For the *Treatment* of dysentery, if the disease is recent and the symptoms acute, a warm bath is very useful, poultices being subsequently applied to the abdomen. Internally castor-oil and opium should be given, or an enema of starch or mucilage, with a few drops of tincture of opium, may be carefully injected. Ipecacuanha is justly held in much favour. It should be given in fairly large doses. The strength must be well supported, and brandy administered. Raw meat finely shredded is of great service in supporting the strength. If obstinate irritability of the bowels continues, acetate of lead, catechu, rhatany, and sulphate of copper may in turn be cautiously used. Very small doses of nitrate of silver have been recommended by Trousseau. Calomel, in an early stage, may be given with great caution, and in very small doses, combined with opium or Dover's powder.

Acute Peritonitis

Is exceedingly rare in children. It has been known to occur before birth, and to have caused the death of the fœtus, but its origin in these cases is probably syphilitic. The symptoms are pain, increased by movement or pressure, the weight of the bed-clothes being insupportable. The child lies on the back, with his knees drawn up, the face expressive of great suffering. The belly is distended, and often tympanitic. Fever and restlessness are present. Diarrhœa is more frequent than constipation, and nausea and vomiting sometimes occur. The pulse is jerking, rapid, and thready.

The treatment should consist in the relief of pain by anodyne fomentations. Calomel may be given, and to procure sleep anodyne enemata may be resorted to. Ice

may be given to control any vomiting that may be present.

The attack may be followed by

Chronic Peritonitis,

A disease almost always associated with tubercle, constituting

Tubercular Peritonitis,

The symptoms of which are pain and tenderness in the abdomen, with more or less swelling. Diarrhœa is present, obscure fluctuation may sometimes be perceived, and the veins over the abdomen are prominent and large. The pain is of a shifting colicky intermittent character; the fluctuation is usually due to the transmission of the manual impulse by the agglutinated masses of the intestine, and is seldom, if ever, caused by ascites.

If a tumour can be detected, it is usually situated in the omentum.

The tongue may be tolerably clean, the appetite moderate, and the bowels somewhat irregular; as the effusion increases, however, the skin becomes hot, and the pulse quick; the breath is short, the strength much prostrated. There is great emaciation, and diarrhœa, death soon resulting from exhaustion, or from the supervention of some tubercular affection.

The treatment should consist especially in the employment of iodide of potassium. Iodine ointment with cod-liver oil should be constantly rubbed into the abdomen; or this part may be painted with iodine, and warm fomentations applied. The strength should be supported by every possible means, and tonics administered; but the prognosis of the disease is always very unfavourable under all kinds of treatment.

CHAPTER IV.

TABES MESENTERICA.

May be described as a tubercular affection of the mesenteric glands, and is not unfrequently accompanied by tubercular peritonitis. The first symptom to attract attention is the enlargement of the abdomen, and the peritoneal cavity may contain some fluid. The emaciation is a striking characteristic, but this symptom may not be prominent at first. The wasting is remarkable for its slowness and regularity, whilst that attending bowel-complaints is variable and rapid. It is by no means easy to separate the symptoms proper to tabes mesenterica from those belonging to disorders of the mucous membrane, which are independent of mesenteric disease, or which tabes shares with other scrofulous diseases. Probably the only unequivocal sign of this disease is the perception of the enlarged mesenteric glands through the abdominal parietes. These cannot, of course, be felt until their decided development and the malady have somewhat advanced, and therefore some degree of doubt must attend these cases in the incipient stage; but still there is a combination of symptoms which with much probability points to the existence of the disease.

Tabes mesenterica may be conveniently divided into three stages, or periods.

1st. The incipient stage, in which enlargement of the glands is present, but the general health is as yet undisturbed, and the digestive organs are not deranged in a marked manner.

2nd. A stage of further advancement, in which the mesenteric glands are perceptibly enlarged, and the digestive derangements decidedly marked. In this stage the stools

present the white colour so frequently exhibited in this disease.

3rd stage: in which the glands of the mesentery become irritated and suppurate, inflammatory affections of the intestinal mucous membrane arise, the emaciation becomes excessive, and the disease ends with colliquative sweats and diarrhœa.

These arbitrary divisions are convenient for the investigation of the complaint, although they may not be found to accord exactly with nature.

Hooping cough or one of the exanthemata may be the commencement of the disease, the child having been perfectly healthy previously to the appearance of these affections. The strength and flesh are gradually lost; the child complains of feeling tired, and wants to be nursed. The bowels at first may be loose, and the motions thin and like yeast, containing mucus and even streaks of blood. There is often swelling of the abdomen, with colicky pains. The patient lies on the back with the legs drawn up, frequently crying with pain. The face is drawn and pinched. The liver may be found below the ribs, as also the spleen.

With the progress of the disease irregularity of the abdomen appears; and occasionally crepitus, from the presence of semi-organised lymph, may be detected when the hand is lightly passed over this situation.

With the advance of the disease irregular nodular masses may be felt in the region of the umbilicus, which have been found to consist of mesentery, omentum, and intestines glued together, containing in their midst the enlarged mesenteric glands. Still later in the disease some ascites may be present, and there is dulness on percussion in the lumbar regions.

Constant diarrhœa and vomiting set in, the temperature rises in the evening, the pulse becomes small and quick,

and the child dies in convulsions or sinks from exhaustion.

During the disease the temperature often fluctuates, and in an advanced stage the evidences of tubercular mischief may be found in other organs.

Tubercular meningitis and pulmonary phthisis are not infrequent terminations to the affection.

Causes.—Tabes mesenterica is generally considered as a scrofulous disease; and it has, in fact, been termed *scrofula mesenterica.* It may generally be regarded as of a strumous nature, but it must not be forgotten that its origin and complications are often of an inflammatory character.

The mesenteric glands are scarcely perceptible at birth, but they gradually develop until the period of dentition, and then actively enlarge. Disease of these glands appears about this period. Infants are rarely affected before the eighth month, but from that time until the eighth or tenth year the disease is liable to occur, most commonly, in all probability, from the third to the sixth or seventh year. The disease is most common among the children of the poor, especially the subjects of the strumous diathesis, and, indeed, any circumstance which tends to produce scrofula also tends to the development of mesenteric trouble; unwholesome food especially has a direct tendency to irritate the mesenteric glands by leading to derangement of the digestive organs. A prominent abdomen by no means predisposes to the development of mesenteric disease, since the mesenteric glands have been found diseased in those children who exhibited no marked protuberance during life; and, again, enlarged and even suppurating glands have been occasionally found in the mesentery of children whose bodies at the time of death were in good condition, and whose health had appeared good.

Tubercular disease of the mesentery may exist alone, and

tubercles may be found in other situations without being present in the abdomen; but in general diseased glands are found in other parts, or some variety of well-marked scrofulous disease is coexistent with the mesenteric mischief.

With regard to morbid appearances, these may be traced from a simple increase of vascularity to the deposition of tuberculous material or the formation of pus.

The glands may be found almost natural or only somewhat reddened, enlarged, and softer to the touch. Usually, however, they are partially converted into a soft, white, curd-like matter, or this is mingled with pus.

These changes may take place without any absolute evidence of irritation originating in the mucous membrane.

Again, tuberculous matter may be deposited in or around the glands, without the appearance of previous inflammation, the glands being pale, and their density not increased.

So long as they remain indolent the tubercles are of firm consistence, and of a yellowish or dull white colour, and their size may not exceed that of a pea. As they increase in number, however, they may attain a considerable size, and may not inaptly be compared to "a heap of peeled chestnuts." Larger-sized tumours may even be developed, in which case the tuberculous matter accumulates around the entire gland as well as occupies its place, and it may even be effused into the laminæ of the mesentery.

The *Treatment* must consist in supporting the general health, and combating symptoms as they arise. Pain and tenderness may be relieved by the application of linseed-poultices to the abdomen. Obstinate diarrhœa may be controlled by catechu or krameria, and the diet should consist of milk, rice, and arrowroot. The syrup of the iodide or phosphate of iron with cod-liver oil are of great service. The abdomen may be painted night and morning with tincture of iodine.

CONSTIPATION, OR COSTIVENESS.

After the meconium has passed away, a healthy child should have an action of the bowels from two to four times in the twenty-four hours. The discharge should be liquid, of a light-yellow colour, destitute of fetid or acid smell, and free from white curdy matter or lumps; pain and any considerable amount of wind should be absent.

Medicine is unnecessary so long as these conditions exist, but an infant may suffer from an amount of costiveness which can hardly be termed disease, and may still require treatment. Less than two stools in the twenty-four hours will demand an aperient, as will also a partially solid or lumpy state of the discharge. The remedies should be of the mildest character. For an infant, half a drachm to a drachm of castor-oil, or a small quantity of hydrargyrum cum creta will generally answer the purpose.

During childhood the bowels should be freed once or twice a day. The colour of the motions should be rather of a darker yellow than in the infant, and they should be more solid, although less so than in the adult. They should be free from mucus or lumps of undigested substances, and should have a feculent odour.

For the treatment of costiveness in the child, two drachms of castor-oil may be given, or a few grains of pulvis rhei and hydrargyrum cum creta, according to the age.

Constipation is of frequent occurrence in feeble children who are fed artificially. The intestinal secretion is deficient, and consequently the motions become very hard and lumpy, their evacuation being attended by painful straining. The abdomen becomes swollen with wind, and if the condition continues the child may sink from the pain and exhaustion.

In older children constipation may be occasioned by

starchy substances, as arrowroot and rice, or by the exhibition of tonic and astringent medicines, and it in some instances probably originates from the neglect of habitually getting the bowels to act at certain regular hours. Constipation not unfrequently accompanies meningitis, hydrocephalus, and marasmus, and it may result from hernia, intussusception, and intestinal obstruction.

The chief symptoms of constipation are — distended abdomen from flatus; the liver, stomach, and spleen are pushed up, embarrassing the descent of the diaphragm, since the contractile power of the bowels is lost. The belly becomes painful, the tongue furred, vomiting may occur, and great restlessness and sleeplessness are occasioned.

In milder cases the symptoms are less marked, the evacuations are dry and scanty, the abdomen is more or less tense, and there are thirst and loss of appetite.

Although constipation is more liable to occur in delicate children who are fed artificially, it nevertheless frequently happens in strong children under the same circumstances. These latter appear quite healthy, with the exception of painful straining when the bowels are moved.

Treatment.—The chief point is to ascertain the cause. The diet must be properly regulated. Milk should be the principal food, but weak animal broths may sometimes be administered. In infants small doses of grey powder and rhubarb may be given, and in older children prunes and senna are of service.

CHAPTER V.

INTESTINAL OBSTRUCTION.

THE causes of intestinal obstruction may be divided as follows:

1. *Intramural*, internal to the intestinal walls—viz., obstructions produced by the lodgment of foreign substances; foreign bodies, as hardened fæces or concretions having gall-stones for their nuclei.

2. *Intermural*, within the walls, arising in and involving the muscular and mucous coats of the intestinal walls—viz., cancerous stricture, usually in the sigmoid flexure of the colon and rectum; non-cancerous stricture, due to contraction of cicatrices after ulceration, or to contraction of the intestinal walls from non-cancerous deposit, inflammation, or injury; intussusception, the ileum and cæcum being most commonly protruded into the colon; intussusception associated with polypi.

In childhood acute obstruction is most frequently caused by intussusception.

3. *Extramural*, external to the walls, acting from without, or affecting the peritoneal covering—viz., bands and adhesions from effusion of lymph, twists or displacements, diverticula, external abscesses or tumours; mesocolic, mesenteric, or omental hernia; diaphragmatic and foramen of Winslow hernia; ischiatic, obturator, or perineal hernia.

The protruded intestine does not frequently become strangulated previous to adolescence. Of acute obstructions in children the most difficult to recognise are those which result from certain complicated malformations of the intestinal tube.

The *symptoms* of intestinal obstruction are, constant vomit-

ing, consisting at first of mucus and stomach contents, but becoming in a few days stercoraceous; the pain is often very acute, there are tympanites, with violent borborygmi, unless the occlusion is high up; hiccup, especially in strangulation of the upper part of the intestines. Constipation is of course the pathognomonic sign.

Upon palpation, increased fulness may often be detected just above the obstruction, with more marked diminution of percussion-resonance at this point than elsewhere. Acute peritonitis usually occurs after a few days. Gangrene is more liable to occur in intussusception, and obturator hernia. The lower the obstruction, the less urgent is the vomiting, and the longer the time before it commences; the higher the obstruction, the greater the diminution in the quantity of the urine.

Treatment.—When the diagnosis is doubtful, castor-oil may be given, or castor-oil and turpentine, or an enema of croton-oil may be used.

When the diagnosis is certain, purgatives are injurious, and fomentations must be applied, or linseed-poultices, and recourse must be had to small doses of opium and belladonna, or to subcutaneous injections of atropine. Food and fluids must be given in small quantities; as a last resort, gastrotomy may be necessary.

INTUSSUSCEPTION—INVAGINATION.

This term implies that one part of the bowel is drawn into another portion, like the finger of a glove pulled within itself. Thus the passage of the intestinal contents is obstructed.

Varieties.—1. Spasmodic or slight cases: in which the invaginated portion has not been sufficiently irritated to become the seat of inflammation.

2. Severe cases: in which the part invaginated has become inflamed, or has sloughed.

Slight intussusceptions have been observed in the autopsies of children who have presented no symptom of intestinal obstruction during life, and who have died of some other affection. The small intestine has been sometimes found invaginated when death has occurred during dentition, and from diarrhœa, in children who have previously shown no symptom of invagination. The invaginated mass is generally from half to two inches in length, and there may be many invaginations only a few inches apart. The traction is almost invariably from above downwards. In about half the cases the ileum and cæcum are protruded into the colon. Ascending intussusceptions have, however, been observed. Three layers of intestine are involved in an intussusception; the peritoneal layer is external, the mucous layer internal, and the invaginated upper part of the intestine forms the innermost layer.

In the simple spasmodic cases the amount of constriction is insufficient to prevent the passage of the contents of the intestines, and the danger is to be apprehended rather from exhaustion than from obstruction; the invaginated portion may be returned to its proper place by the normal ventricular motion of the intestines.

The severe forms of intussusception produce very distinct symptoms, giving rise to a definite abdominal tumour, and the invaginated gut may be partially protruded into the rectum.

In infants the lower end of the ileum is most frequently involved, probably due to the loose attachment of the cæcum in the right iliac fossa, its muscular coat being but imperfectly developed in early life, the ileo-cæcal valve permitting the ileum to slip through.

Causes.—In very young children diarrhœa may give rise

to intussusception, and in other children this condition may arise from diarrhœa, dysentery, or muco-enteritis; irregular contractions of the intestinal viscera from the ingesta may be considered amongst the common causes. The male sex is more prone to invagination than the female. In young children the structure of the intestinal walls is very delicate and imperfectly developed, and hence the liability to the accident.

Contusions and blows on the abdomen, producing constipation or diarrhœa, may be followed by invagination, and it is stated that tossing a child up in the arms with a jerk, and bringing it quickly to the ground may lead to intussusception. In severe forms the ileum is usually invaginated into the colon; in the mild cases the invagination is generally in the small intestines.

Symptoms.—These are usually pallor, faintness, griping paroxysmal pain, and obstinate constipation, or there may be discharge of blood and mucus per anum; at first, pressure with the hand can be borne, but after a time great abdominal pain, tenesmus, and vomiting arise. In very young children convulsions may occur; vomiting is very frequent, the stomach-contents only being at first thrown up, but the vomit afterwards becomes grass-green and eventually stercoraceous. Careful examination of the right hypogastric or iliac regions will usually discover a solid cylindrical tumour. Intussusception may end in recovery in three or four weeks, or prove fatal in a few days; but to infants it is nearly always fatal. The ileo-cæcal and colic forms of intussusception may be easily distinguished from that of the small intestines. In the ileo-cæcal form there is much tenesmus; the motions are simply blood-stained, the symptoms of obstruction are absent or late in appearing; the abdominal tumour is large, fixed, and easy to feel, and the invagination is not unfrequently detected in the rectum.

When the small intestine only is implicated, there is very little, if any, tenesmus; severe hæmorrhage takes place both by vomit and by stool; the symptoms of obstruction are very early in appearing, the abdominal tumour is movable and small, and the invagination cannot be detected in the rectum. Recovery is much more frequent in the latter form, in which also sloughing and expulsion of the invaginated gut far more often occurs.

Treatment.—This is much the same as in intestinal obstruction. At first castor-oil may be given, or warm-water enemata; but these measures must be discontinued if they do not move the bowels. Small doses of opium may be given to keep the intestines in repose, and fomentations should be applied to the abdomen. For the relief of distressing vomiting, ice to suck, iced water and diluted hydrocyanic acid may be given. Absolute rest must be enjoined, and the simplest diet employed. Copious enemata of warm water, thin gruel, or soap and water may be forcibly injected, or warm water may be poured through a funnel, the height being varied according to the force requisite, a piece of india-rubber tubing a yard or two in length being attached at one end to the funnel, and by the other to a tube inserted into the rectum. Inflation by air has also been successfully employed. After all other measures have failed, gastrotomy must be performed; but to be employed with success this operation must not be delayed more than three or four days if the symptoms are severe, since inflammation of the invaginated gut may ensue and set up adhesions with contiguous parts.

CHAPTER VI.

ABDOMINAL TUMOURS.

The conditions which may give rise to enlargements in the abdomen are the following, viz.: Fatty, lardaceous, cancerous disease, and hydatids of the liver; enlargement and hypertrophy of the spleen ("sago spleen"); cancer and tubercle of the kidney and hydronephrosis; and cancer of the stomach.

A child by nature has a "big belly," and when it is brought for such a condition, in many cases the enlargement of the abdomen is quite natural and is not associated with any disease; it does, however, sometimes happen that the enlargement is accompanied by tubercular peritonitis or rickets.

The organs which most often occasion *real* abdominal tumours are the following, and in the following order of frequency: first the liver, then the spleen, and finally the kidneys.

The liver may be the seat of fatty deposit, "*The Fatty Liver*," a condition often associated with pulmonary consumption. In the infant at the breast the hepatic cells are generally filled with fat, and during the first few weeks of life the liver may frequently be felt enlarged from injudiciously cramming the infant with nourishment. Obstruction to the circulation of blood, as in heart disease, especially disease of the mitral valves, and constriction of the thorax from angular curvature, may induce congestion and enlargement of the liver. The organ becomes enlarged uniformly, the capsule distended, and the tissue more firm in those cases of mechanical obstruction to the onward flow of blood.

The general *Symptoms* are, slight jaundice (but this symptom is frequently absent); confined bowels; scanty, high-coloured and somewhat albuminous urine; there are debility and anæmia, and sallow complexion, languor, flatulence, and depression of spirits. At first the enlarged liver feels tense and smooth, but at a later period it becomes uneven and granular. The superficial veins of the abdomen are not enlarged, and ascites is absent.

The *Treatment* can only be palliative; a few leeches may be applied to the right hypochondrium when painful, or dry cupping may be employed; mild saline purgatives, vegetable bitters, alkalies, and taraxacum may be given internally.

The Lardaceous, Waxy, Amyloid or Albuminoid Liver may form considerable tumours; it is usually associated with caries or necrosis of bones (chiefly of the vertebræ and joints, more rarely of the shafts of the long bones), with rickets, constitutional syphilis, and tubercle of the lungs and intestines. A similar waxy condition may coexist in the lymphatic glands, spleen, blood-vessels, and kidneys. Amyloid disease of the liver may last for many months, and very few symptoms are presented during its early career; the organ may become considerably enlarged before the general health is affected. At a later period, enlargement of the spleen, ascites, and albuminuria may result.

The liver in this disease is smooth on the surface; its structure is hard, and its edge sharply defined.

The general *Symptoms* are those of anæmia and wasting; there are anorexia, gastric irritation, and occasionally vomiting and diarrhœa, the stools being pale; slight fever may also be present, with quick pulse, cough, and dyspnœa. The presence of waxy casts in the urine may aid the recognition of the disease by showing a simultaneous participation of the kidney in the amyloid degeneration. Enlargement of the cervical and submaxillary glands is often met with.

The affection may end in peritonitis, pneumonia, or other disease of the lungs, but it usually terminates in ascites, general anasarca, or exhaustion.

After death the liver is generally found enlarged, smooth, and of firm consistence; on section, its surface is glistening and pale, and the tissue gives a reddish-brown coloration with tincture of iodine. Methyl-aniline colours the tissue deep violet.

Microscopically the amyloid material is seen first affecting the minute vessels, especially the arteries; it then extends to the capillaries and subsequently involves the proper elements of the invaded texture.

The *Treatment* must consist in remedies which are addressed to the co-existing complications, viz., iodide of potassium and iodide of iron, chloride of ammonium, cod-liver oil, etc.

Cancer of the liver is very rare in children, but when it exists the symptoms are the cancerous cachexia, emaciation, pain, sallowness, and diarrhœa. The tumours may be nodular, hard and tender; ascites is sometimes present, and jaundice when it occurs is often persistent. The spleen is generally unaffected and not enlarged. Dyspepsia is usually an early and constant symptom. Towards the close of the disease hæmorrhage may occur.

The *Treatment* can only be palliative.

Hydatid Tumour of the liver is somewhat rare in children, and until the mass becomes considerably large few symptoms are exhibited. A membranous cyst or sac is found, which contains a limpid, colourless, non-albuminous fluid. In this fluid float a number of other cysts termed acephalocysts, or headless cysts, to the walls of which are attached the hooklets or scolices of the echinococcus.

The right or left hypochrondrium may be the seat of a rounded bulging tumour, which is elastic, smooth, and

globular, and may communicate to the finger a sensation of fluctuation.

The constitutional indications are often very slight; there is no fever; and pain, jaundice, and ascites are usually absent, but the pressure of the growth eventually gives rise to dyspnœa, constipation, palpitation, and œdema. The hydatid cysts may burst in many directions, either externally through the abdominal parietes, or internally into the pleura and lungs, the intestines or peritoneum, causing pleurisy, pneumonia, and expectoration of their contents, or their expulsion by vomiting or evacuation, according to the course taken by the bursting.

The most fortunate termination is that in which the tumour breaks into the intestines or stomach. The affection may sometimes end in recovery by the secretion of a putty-like mass which chokes the hydatid. The spleen is frequently the seat of hydatids, simultaneously with their formation in the liver.

The *Treatment* should consist in carefully puncturing the sac with a fine trocar, and injections of iodine or carbolic acid may be tried; iodine ointment, rubbed over the enlargement, and the exhibition of iodide of potassium internally, are measures which have been successfully employed.

The "*Sago Spleen*" is so-called since it presents little bodies resembling grains of sago, which are turned reddish-brown by tincture of iodine. This really is a state of amyloid degeneration.

The general *Symptoms* are not well defined, but when the organ becomes considerably enlarged, there may be some pain, often in the left hypochondrium, or in the epigastrium. The complexion of the child is pale and sallow, the tongue clean and bloodless, the pulse rapid and weak, and the flesh and strength are gradually lost. The bowels may be confined, or there may be offensive diarrhœa.

As the disease advances the child becomes anæmic. There are œdema of the limbs, and hæmorrhage from the nose and gums; and if these symptoms continue, the patient may sink from exhaustion. Death is often caused by diarrhœa.

In some cases, however, there are no symptoms beyond the inconvenience of the tumour.

The *Treatment* must be directed according to the symptoms, but ferruginous tonics are specially indicated. Poultices, fomentations, and even a few leeches, may be applied over the seat of pain.

Cancer of the Kidney occasionally gives rise to tumour. The same symptoms are present as in cancer of the liver, viz., the cancerous cachexia, diarrhœa, gastric irritation, occasionally hæmaturia—this, when present, is a symptom of great significance. When the left kidney is affected it is distinguished from enlarged spleen by its rounder outline in front, and by the greater extent of the tumour in the lumbar region, the spleen presenting a sharp edge. When the right kidney is affected it is generally separated by an intestinal coil from the liver.

Tubercle of the Kidney may also occasion a tumour, but this affection usually occurs as a part of a general tubercular diathesis, and will not therefore exhibit any special symptoms other than those of tubercle generally.

Hydronephrosis, or dropsy of the kidney, results from an escape of urine from the kidney, the pelvis of which becomes dilated into a bag or pouch, its substance becoming absorbed or atrophied. The tumour becomes enormous, and presents a soft fluctuating mass in the abdomen; in the cyst are contained watery urine, uric acid, and earthy salts, and occasionally blood, pus, and epithelium.

This condition may be caused by a calculus impacted in the bladder, by an imperforate urethra, or by a growth

in the pelvis compressing the ureter. The symptoms are dependent upon the size of the tumour, and the pressure exerted on the neighbouring organs. The usual site is the lumbar region, extending downwards to the iliac region, and forward to the umbilicus. The tumour itself is fluctuating and soft, but it may be lobulated, and when of large size induces dyspnœa, and prevents the child from lying down.

The sudden disappearance of the swelling occurring simultaneously with a sudden discharge of urine must be regarded as pathognomonic of the affection. If there be an impacted calculus, attacks of nephritic colic and vomiting are of frequent occurrence, and pus and blood may be found in the urine. When both kidneys are affected uræmia may supervene. A calculus may, however, be dislodged, and the sac, emptying itself, shrivels up. Peritonitis, suppuration, or pyæmia, with hectic fever, may follow, and chronic tuberculosis has been observed.

The *Treatment* should consist in a milk and fluid diet; friction and shampooing the tumour, or tapping may be resorted to.

Cancer of the Stomach is very rare in children, but when it does occur it may give rise to severe dyspepsia, hæmatemesis, and pain after all kinds of food. When the stomach is diseased, the percussion note is tympanitic; when the liver is affected, it is dull.

Treatment can, of course, only be palliative.

CHAPTER VII.

WORMS: VERMES: VERMINATIO.

Worms are far more common in children than in grown persons; they are extremely rare in children at the breast, but a few cases have been observed. Strumous, ill-fed children, residing in low situations, and those who are liable to bowel complaints, are the most frequently troubled with worms. The protracted use of the farinacea or of innutritious diet, with little animal food, or insufficiency of common table-salt, have been regarded as causes of worms.

There are no symptoms that absolutely belong to worms. Their presence can only be known with certainty by their being seen.

The symptoms occasioned are merely indicative of irritation of the mucous membrane of the intestines, although there are a group of symptoms which indicate the presence of worms with a fair amount of certainty. These symptoms may be classified as—

(1) Those directly dependent upon the presence of the worm in the alimentary canal, and

(2) Those associated with the sympathetic relations of the digestive organs, and occurring therefrom symptomatically.

The particular species of worm and its position in the intestinal canal will also occasion some difference in the symptoms.

When these parasites infest the stomach in the upper part of the alimentary canal, they usually cause more severe symptoms, especially of the sympathetic kind, than when they are situated lower down.

The symptoms ascribed to worms are the following:— The child looks pale and becomes emaciated, the belly

swells and becomes hard, gnawing, twisting pain being felt about the umbilicus. The appetite varies; it is generally voracious, sometimes very small. There is fœtor of the breath. The bowels are alternately purged or constipated, and much mucus appears in the stools. The nose is frequently picked, and the rectum is often the seat of much irritation. If the child is old enough, he may at times complain of a sensation of sinking or fainting, and this symptom appears particularly to attend the irritation of worms.

With the presence of these symptoms and the absence of disease of the intestinal mucous membrane or of the mesenteric glands, there are strong grounds for believing that worms are the cause.

The sympathetic disturbances are as follows:—The sleep is unquiet, and frequently startings are observed; grinding of the teeth is common. The eyes may be fixed and wild, the pupils dilated. Listlessness and depression of spirits are present. The breathing may be hurried and oppressed; the pulse is quickened, and cough, which is a constant accompaniment of worms, is dry and of a suffocative character. Vomiting, hiccough, tenesmus, diarrhœa, and bloody stools frequently accompany their presence.

Convulsions often occur, and there are many other constitutional disturbances which may arise.

Varieties of Worms.

The following are the chief:—

1. The Thread-Worms, of which there are two kinds. To these children are particularly subject.

(*a*) The Long Thread-worm, *Trichocephalus Dispar*, slender, and about two inches in length, of a white colour, and resembling a thread, whence its name; inhabiting the large intestines, and especially the cæcum, occurs in large

numbers, but does not appear to cause distress; it is not accompanied by peculiarities of symptoms.

(*b*) The SMALL THREAD-WORM, *Ascaris* or *Oxyuris Vermicularis*, termed collectively ascarides or oxyurides. This is very common in children; it is about a quarter of an inch in breadth, and an inch in length, and inhabits the cæcum, the entire length of the colon, and especially the rectum. These worms may frequently be seen in great numbers in the stools, resembling pieces of cut thread; if recently evacuated they are generally found in rapid motion, hence probably the great distress they occasion as compared with the Trichocephali. They often creep out of the rectum, and may be discovered in the bed-clothes, or may be found clustering round the anus when the nates are separated. A characteristic sign of their presence is the irritation and itching in the rectum. The presence of these worms is often attended by great sympathetic disturbance: picking of the nose or mouth is a constant symptom; when irritation of the rectum is occasioned by ascarides, a sickening or gnawing pain in the stomach is often complained of.

2. THE ROUND-WORM, *Ascaris Lumbricöides*. This resembles the ordinary garden-worm; it is light yellow in colour, and three to nine inches in length. The fecundity of this entozoon is prodigious, and it has been calculated that the body of the mature female may contain as many as sixty-four millions of eggs. In the female the posterior extremity is comparatively slender and pointed; in the male it is bent round like a hook. This worm is frequently met with in children, its habitat being the small intestines, especially the ileum. It occasionally crawls into the stomach, and is vomited.

Round-worms may be present without causing distress, but when they give rise to symptoms they are particularly prone to occasion severe colicky pains about the navel, and

a distressing sensation of faintness; at the same time, voracious appetite and emaciation may be present.

3. The Tape-Worm, *Tænia Solium.* This is common in children, but is rare under six years of age. It inhabits the whole tract of the intestines, but especially the ileum; joints of the tænia often pass from the bowels, even without medicine, and they may escape as the child moves about. There are no special symptoms by which this worm may be recognised before it is expelled from the bowels. The worms vary in length from four to twenty feet, and they may occupy the entire length of the intestinal canal. They are white and flat; the head is small, and furnished with four suckers, between which is the mouth, encircled by five hooklets. Each segment of the worm represents the independent form of the sexual animal, and contains female and male generative organs. In the centre of the segment is a branched organ (the ovisac) which may contain thousands of ripe spherical eggs.

Treatment.—For the *thread-worms:* Since these are usually seated in the rectum, injections are of great service, such as lime-water, common salt, infusion of camomile, infusion of quassia (4 to 8 ounces), or any substance containing tannin. Large numbers may be discharged, however, by aperients; calomel and jalap, santonine, or the compound scammony powder, are often very efficacious remedies.

For the *round-worm:* For this the compound scammony powder is the best purgative, either given alone or combined with calomel. Santonine is considered a specific against this entozoon; it should be given in doses of one to six grains at bed-time, and followed by a purgative of compound scammony powder (grains 10 to 15); enemata of strong infusions of wormwood, rue, or tansy may also be employed.

For the *tape-worm:* Considerable portions of this worm

may be removed by various remedies. The whole worm is less often expelled. The head should always be searched for, since until this is removed no effectual relief can be obtained. Oil of turpentine in small doses may be given, followed in two hours by castor-oil (half an ounce). Infusion of kousso is an effectual remedy. The best preparation, however, is the liquid extract of male fern, in doses of one-half a drachm to one drachm, according to the age of the child. Kamala may also be given.

These remedies must be given when the stomach is empty; castor-oil should be given at night; the vermifuge the first thing in the morning, and another dose of castor-oil about two hours after. No food whatever should be taken during the administration of the medicines.

Mode of introduction and source of the worms.—It is conjectured that the ascarides are conveyed by unripe fruits and salads, and obtain admittance into the intestines in an embryonic condition. The source of the round-worm is unknown, but that of the tape-worm is often measly pork.

CHAPTER VIII.

DISEASES OF THE LIVER.

Congestion of the Liver

Is not uncommonly observed in children.

It occurs under two forms—active and passive.

The *Active* form may be caused by cold or by overfeeding, and presents the following symptoms, viz., confined bowels, bad appetite, sallow skin, foul tongue, clay-coloured stools, yellowish conjunctivæ, and high-coloured urine,

weight and fulness in the right hypochondrium, in which region the edge of the liver may sometimes be felt below the ribs.

It must be borne in mind that in early life the liver is larger in proportion in the child than in the adult.

The *Passive* form of congestion may be induced by organic diseases of the heart, especially regurgitant mitral disease, or by dilatation of the right heart cavities, by which the return of blood through the veins is mechanically obstructed.

Enlargement of the liver may be associated with emphysema or chronic disease of the lungs, or with ascites, and it has been seen in diseases of the mesentery and in rickets.

In addition to the above symptoms there may be tightness or dragging pain below the ribs on the right side. Pain is, however, frequently absent, and the simple congestion in children is not usually accompanied by jaundice ; vomiting and diarrhœa are not unfrequent accompaniments.

Treatment.—This must consist in avoiding overfeeding and paying attention to the laws of health. A mild mercurial with saline aperients may be exhibited. A warm bath at bed-time is of great service ; a hot poultice may be applied over the liver if there be pain over that organ. Taraxacum with nitro-hydrochloric acid is beneficial, and small doses of ipecacuanha are useful in increasing the action of the skin. Small doses of calomel are said to stimulate the duodenum and upper bowels, and to propel the bile along the intestines.

Cirrhosis of the Liver

Is extremely rare in children, but a few cases have been observed. The symptoms are jaundice or sallow hue of skin, dry furred tongue, thirst, confined bowls, high-coloured scanty urine, tenderness and pain in the right hypochondrium,

and hæmorrhage from the bowels or from the nose may occur, and ascites is usually present. In children this affection appears to be associated with hereditary syphilis, or to occur in the offspring of drunken parents. It would appear also to be caused by a sluggish liver, want of regular exercise, cold and chills.

Pathology.—The disease consists in a fibroid hypertrophy of the capsule of Glisson. The organ at first is increased in size through the infiltration of small round cells into the connective-tissue of the portal canals, the increased size depending upon the amount of the cell-proliferation. At a later period, the cellular tissue contracts, the liver diminishing in size, compression of the portal veins takes place, and the passage of blood is obstructed. Some of the branches of the portal vein are completely obliterated, and thus portions of the liver shrink and become atrophied. Compression of the small gall-ducts also takes place.

The hepatic cells become disintegrated and undergo fatty degeneration.

The *Treatment* should consist in a light diet, such as eggs, milk, farinaceous food, poultry, and white fish. Early in the disease a few leeches may be applied over the liver. Small doses of rhubarb and grey powder will be of service, and taraxacum, with diluted nitro-hydrochloric acid, may be given.

For the ascites, decoction of broom, acetate of potash, and other diuretics, and the compound jalap powder, may be exhibited. Iodide of potassium and mercurials will be indicated if there be any history of syphilis. As a last resource, paracentesis abdominis must be performed.

Syphilitic Liver

Is usually observed in the subjects of hereditary syphilis, and generally consists in hypertrophy and hardening of the organ, which creaks as the knife is passed through it. On pressure a slightly yellow serous fluid only is forced out, but no blood; a few small opaque grains are observed on a uniform yellowish ground, with some delicate arborescence formed by empty bloodvessels.

Microscopically, a fibro-plastic material is presented.

The *Symptoms* are generally indefinite; jaundice is absent, but there may be confined bowels, or diarrhœa and vomiting.

Three varieties of syphilitic liver are described, viz.

1. Simple Interstitial Hepatitis.
2. Waxy, Amyloid, Lardaceous, or Albuminoid Liver.
3. Hepatitis Gummosa.

These forms may exist independently, or may be met with in the same liver.

The *Waxy* liver is usually found in rickety children. The connective-tissue surrounding the portal vessels is increased, and the liver is harder, more elastic, and paler than normal.

Acute Yellow Atrophy

Of the liver is exceedingly rare in children; it is supposed to be caused by hyperæmia and diffuse inflammation of the liver.

The *Symptoms* are nausea, constipation, diarrhœa, furred tongue, feverishness, and jaundice, the bowels at the same time containing bile, but the bile-ducts quite free; there is quick pulse, coffee-ground vomiting, melæna, and epistaxis; the urine is of a dark brown colour, and contains leucine,

tyrosine and bile. At the end of the disease, which is always fatal, delirium, convulsions, and coma may appear.

Pathology.—The liver-cells undergo rapid degeneration; the organ is shrivelled and shrunk, and the lobular divisions are indistinguishable. It may also be flabby and soft, of a brownish-yellow or light yellow or orange-crimson tint. The hepatic cells entirely disappear, and only granular matters and oil remain, the gall-bladder is empty, the spleen enlarged and congested, but the biliary ducts are pervious.

The *Treatment* is almost useless, but cupping and leeches over the liver may be tried; emetics and small doses of calomel may be given, or sulphate and carbonate of magnesia.

Other diseases of the liver have been described under the abdominal tumours.

Jaundice. Icterus.

The skin and conjunctiva of the eye are frequently the seat of more or less yellowness in infants of two or three days old. In ordinary cases this colour apparently depends upon the active commencement of bile-secretion. More of this fluid is formed than is requisite for the use of the digestive functions, and is then disposed of by the skin and excreting organs. It usually disappears spontaneously, and demands no remedial measures; if it should last for more than a few days, a drachm of castor-oil or a few grains of grey powder and rhubarb will set matters right.

Obstruction or malformation of the biliary ducts may, however, give rise to jaundice, but it is then permanent, and may prove fatal, especially if organic disease be present.

In children the symptoms usually commence with vomiting and headache; there are anorexia and languor, and indisposition to exertion, but pain is generally absent, even

with considerable enlargement of the liver. The conjunctiva and the body generally assume a yellow appearance, the pulse is slow, and the temperature normal, unless the amount of liver-congestion present is sufficient to cause severe pain, in which case there are fever symptoms and dryness of the skin. The urine is of a dark sherry colour, in extreme cases resembling porter, from the amount of bile present, and by it linen is stained yellow.

In severe cases objects appear yellow to the eye, and the sweat and saliva are yellow. The bowels are as a rule confined, and the motions clay-coloured, from the absence of bile. Occasionally there is diarrhœa, and when the bile-duct is entirely obstructed the stools are destitute of colour. In cachectic constitutions hæmorrhage may occur from the mucous membranes, and petechiæ appear on the skin.

Causes.—In very young children and infants jaundice may arise from cold or from a vitiated atmosphere, the functions of the skin and respiratory organs being imperfectly performed. Feeble, delicate children are the most liable to attacks of jaundice.

Independently of the above causes, however, icterus may be produced by inflammation or obstruction of the bile-ducts, by enlargement and inflammation of the umbilical veins of the liver, or even by the gall bladder being absent. Gall stones may obstruct the bile-ducts, but these are rare in children; or the ducts may be obstructed by cancer of the pancreas, or liver, or by spasm, or inflammation, or by constipation, the loaded intestine compressing the ducts.

The disease essentially consists in retention of the bile in the liver, this fluid transuding through the bile-ducts and capillaries into the circulation. Congestion of the liver may give rise to jaundice, the secretion of bile being lessened in consequence of the engorged vessels compressing the bile-ducts, and preventing the free passage of bile through these

tubes. The liver is increased in size, its margins are pale, and its central portions deep red.

Round-worms entering the opening of the bile-ducts have occasioned jaundice, causing vomiting and biliary colic.

In older children this complaint is more often observed in the summer and autumn.

Treatment.—In infants and very young children, when the disease is occasioned by cold, little is required beyond keeping them warm, and giving no food except the breast milk. The skin will then by degrees regain its normal functions. A small dose of hydrargyrum cum creta, or castor oil, may, however, be advantageously administered.

In older children, if there be tenderness or pain in the region of the liver, a few leeches or a linseed poultice may be applied. A few grains of grey powder may be given with a mixture of sulphate of magnesia and taraxacum or nitro-hydrochloric acid and gentian. A very important point is to keep the bowel well open.

Icterus Neonatorum

Is simply caused by the changes in colour that the skin undergoes during the first few days of existence, and can hardly be termed a disease. It generally happens in children prematurely born or of feeble constitution, and is apparently dependent upon impairment of the functions of the skin or upon defective respiration, the hepatic mischief being only secondary. After the birth of the infant the skin becomes much congested, and this congestion usually declines by degrees, until in a few days a rosy tint is presented; it sometimes, however, happens that in children who, in other respects, are quite healthy, the skin acquires an orange-yellow tint, the motions and urine remaining per-

fectly natural and the conjunctivæ clear. The condition is, therefore, as a rule, a simple discolouration of the skin; but, nevertheless, very serious conditions may be present, such as obstruction of the bile duct, resulting from congenital stricture or from suppression of the bile, or the jaundice may be pyæmic; set up by phlebitis of the umbilical vein. In these cases bleeding from the umbilicus readily occurs, a constant oozing going on from the granulating surface of the umbilicus.

CHAPTER IX.

DISEASES OF THE KIDNEYS AND URINARY ORGANS.

Congestion of the Kidneys

Is of two kinds: *Active and Passive.*

It is frequently found in the disorders of children, and usually passes off and leaves no trouble behind.

Active congestion takes place in measles, scarlatina, and numerous inflammatory diseases. It is frequently well marked in scarlet fever, but is far less so in measles.

Passive congestion is more frequently observed in connexion with valvular disease of the heart, especially in mitral regurgitation; it also occurs in emphysema, pleurisy with effusion, in pulmonary, and hepatic diseases; the renal veins are distended by the repletion of the venous system, and a transudation of serum takes place through the walls of the engorged Malpighian capillaries, the urine becoming albuminous.

The kidney is at first enlarged, but it subsequently contracts and becomes atrophied, its surface being uneven and finely granular with the advance of the congestive process.

The *Treatment* should consist in entire rest, in the administration of cathartics, and in tapping the abdomen or chest, if effusion should take place in these situations. Congestion of the kidneys may produce an intermittent hæmaturia.

Acute Desquamative Nephritis, or Acute Tubular Nephritis,

Presents much the same symptoms in the child as in the adult. These are general fever, high temperature, thirst, headache, pains in the loins, pallor of the face, puffiness under the eyelids, general dropsy with œdema of the lower limbs and the hands; inflammation of the lungs is sometimes present, and pleuritic, abdominal, or pericardial effusions are common accompaniments. The urine is albuminous, scanty and high-coloured from the presence of altered blood corpuscles, and microscopically this fluid will exhibit blood, epithelium, and tube casts. Occasionally delirium, coma, or convulsions may follow from the contamination of the blood with poisonous elements, viz., urea and uric acid.

The chief causes are scarlatina, and exposure to cold and wet.

The dropsy of scarlatina usually occurs about the 10th or 14th day of the fever, but cases have been observed in which it has not appeared until the end of the 5th and even the 7th week. Acute desquamative nephritis is sometimes associated with rheumatic fever, pneumonia, small-pox, enteric fever, measles, and diphtheria.

On *post-mortem* examination, if death occurs in the acute stage, the kidneys are found enlarged and congested; their

colour is chocolate or dark red, the medullary cones are congested and dark, and the cortical portions are mottled by anæmic spots. The tubuli uriniferi are crammed with blood and epithelial cells, the capillary walls are thickened, and the kidneys, ureter, and bladder are congested.

The *Treatment* should consist in keeping the patient in bed in a temperature of 65° or 70° Fahr.; diluent drinks, milk, veal or mutton broth, sago, and barley-water may be given. Leeches or cupping may be applied to the loins. The compound jalap powder is useful for unloading the bowels, and liquor ammoniæ acetatis may be exhibited. Water is considered by Dickinson to be the best diuretic, and as much as two or three pints may be given daily. The complications must be treated as they arise. During convalescence, iron preparations and cod-liver oil will prove serviceable.

Chronic Desquamative Nephritis, or Chronic Tubular Nephritis,

Is extremely rare in children. It may be due to the same causes, and presents the same symptoms in children as in adults, viz., pale pasty face, anorexia, nausea, dropsy, vomiting, and diarrhœa. Albuminuria has been seen in an infant seven weeks old.

The case of a girl eight years of age presented the following symptoms, viz. :—Dyspepsia, extreme pallor and pastiness of face; the urine was high-coloured and scanty, but no trace of albumen was visible. After death the kidneys were in the condition of the smooth white kidney of Bright; the capsule peeled readily, and the organs were slightly enlarged. The surface was depressed in parts, and atrophic changes had commenced.

Intertubular Nephritis.

The small, granular contracting kidney has in a few instances been seen in children, following an attack of scarlatina of some years previous; dropsy is usually absent, but transient puffiness of the ankles and eyes may take place. The face in these cases is usually sallow, and the least exertion may produce dyspnœa in consequence of changes in the heart or from œdema of the lungs.

Simple hypertrophy of the heart is frequently associated with the granular kidney; the blood-pressure in the arteries is raised by the morbid material passing with difficulty through the capillaries, and the blood-flow being thus obstructed, hypertrophy of the left ventricle ensues.

In a case six years of age, an atheromatous degeneration in the aorta and mitral valve has been found in connexion with granular kidney.

The Lardaceous Kidney

Has been occasionally seen in children.

The *Treatment* should combine a strict attention to diet, which should consist especially of milk and water, and the administration of remedies directed to the particular symptoms of each case.

Other diseases of the kidney have been described under the abdominal tumours.

Dysuria—Calculi and Renal Concretions.

Calculous affections in early life are very common, the urinary passages being then very prone to become irritated by derangement of the digestive functions.

Lithiasis is characterised by pain and weight in the loins. The urine is high-coloured and scanty, and difficult to pass, the tongue is furred, the appetite voracious, and the bowels

confined; the child loses all activity, and becomes listless and languid, restless and feverish at night. The milkiness of urine of children, which sometimes causes so much alarm, is occasioned by the deposition of *white* urates. The colour of the pink or brick-dust urate is due to purpurine.

The commonest form of gravel consists of free uric or lithic acid (forming the so-called cayenne pepper-grain deposit), or of urate or lithate of ammonia (the brick-dust sediment).

The *Symptoms* of the passage of a calculus from the kidney to the bladder are not so marked in children as in adults; there is feverishness, difficulty and pain in passing urine, pain and tenderness in one loin, faintness, and vomiting.

Treatment.—A warm bath may be given, and hot poultices may be applied to the loins. The bowels must be kept free with castor oil, and a mixture containing tincture of henbane and a salt of potash may be administered. The diet should be limited to barley-water, milk-and-water, and arrowroot. The urinary deposits and calculi in children, as a rule, consist of urates, and therefore the appropriate remedies are the alkalies and their carbonates.

Stone in the Bladder

In children presents no symptoms differing from the same condition in the adult. The desire to pass water is frequent, and its passage is attended by pain, and it sometimes contains blood; the stream is occasionally arrested, and the prepuce becomes elongated and sore, since the irritation causes the constant application of the child's hand. Calculus in children often commences with dysuria and prolapse of the anus. In female children, calculi are very rare, but they are often seen in the opposite sex.

Hæmaturia, or Discharge of Blood from the Kidneys, in the child may accompany purpura, scarlatina, tuberculosis, or other disease in which the composition of the blood has undergone change. Sudden hæmorrhage from the kidney has succeeded the disappearance of pustular eczema of the body and face, after a duration of two years.

The *Treatment* will consist in hæmostatics, such as gallic acid and perchloride of iron.

Enuresis, or Incontinence of Urine,

Is a common affection in children. It is sometimes a matter of extreme difficulty to recognise the cause, and the condition often baffles all remedial measures. It is often caused by loss of power over the bladder and sphincter in strumous and delicate children. It may be found in the progress of vesical and cerebral disease, and may often be traced to spinal irritation, gastro-intestinal disturbance, excess of uric acid in the urine, or to the presence of thread-worms in the rectum.

In some cases, however, no cause for the incontinence can be traced; a long prepuce is, however, a frequent cause.

In some cases the loss of control over the bladder occurs only at night, in others, in the daytime as well. At times, there is a constant desire to void the urine, and the child is quite incapable of holding it as soon as the desire to pass it is present. In other cases, the dribbling is almost constant. Boys are much more often affected than girls.

Enuresis is usually dependent upon some abnormal state of the bladder-centres situated in the lumbar portion of the spinal cord.

When micturition is normal, the centre of the cord

receives the feeling of fulness in the bladder, until an efferent impulse is excited in the sphincter, by which the contents of the bladder are relaxed and allowed to escape. In early infancy consciousness is not excited by this, since micturition is at that period involuntary, and essentially reflex. When the first dentition is completed, the consciousness to pass water is experienced. In most cases of nocturnal incontinence, throughout the wakeful period, the child is conscious of this demand, but at the time of sleep reflex action proceeds, consciousness not being excited. In the worst cases, enuresis takes place both in waking and sleeping.

At puberty, when perfect development of the spinal centres takes place, the incontinence of urine generally ceases.

Treatment.—The child should be made to lie upon a hard bed; at bedtime the amount of fluid must be limited, and when the child has been asleep for two or three hours, he should be roused and made to pass water; during the night the same proceeding should be adopted to prevent the bladder becoming too full. Lying upon the back should be prevented, a handkerchief with a knot over the spine being fastened round the waist.

The extract of belladonna is the most valuable drug in the treatment of this affection. It may at first be given in doses of one-eighth of a grain three times daily, the amount being increased by degrees until the pupil becomes dilated. In some cases the belladonna may be advantageously combined with bromide of potassium.

In cases of debility, the perchloride of iron or a small quantity of liquor strychniæ may be exhibited. Tonics generally are of service; cold sponging to the back and loins is often useful. Cauterisation of the neck of the bladder should never be neglected in very obstinate cases. Hydrate of chloral has been administered with success in some

instances. If an elongated prepuce is the cause, this must be removed.

Acute Cystitis, or Inflammation of the Bladder,

May sometimes be caused in children by the irritation of a calculus in the bladder or from injury.

The *Symptoms* are, straining during the passage of the urine, which may be followed by a few drops of blood, pain over the pubis, and a sense of weight in the perinæum ; considerable secretion is poured out by the mucous membrane of the bladder, which is swollen and injected. In chronic forms of cystitis, pus and mucus are poured out freely.

The *Treatment* must consist in keeping the patient in bed, a warm bath being given at bedtime. A poultice may be applied to the lower part of the abdomen or to the loins. Liquor potassæ with mucilage may be given in some cases combined with opium or citrate of potash, and belladonna may be employed. Milk-and-water or barley-water, veal or chicken-broth, must constitute the diet.

Leucorrhœa, or the Whites,

Is a common affection in female children. It is sometimes confined to the vulva, but may at other times extend to the vagina, in which case the affection is termed vaginitis.

It may occur as a complication of scarlatina or follow this affection, and is often observed in scrofulous subjects.

Thread-worms and dentition are frequent causes. Frequently the course is tedious, unless the irritating source can be removed—viz., the worms and dentition. The presence of leucorrhœa in female children has frequently given rise to false charges of indecent assault, and there are no absolute means of distinguishing the leucorrhœal discharge from that of gonorrhœa ; but the true nature of the case may generally

be known from the history of the case, the amount of swelling, the absence of marks of injury, the absence or presence of pain on passing water at the commencement of the attack, and the fact of the hymen being intact.

Infantile leucorrhœa is highly contagious; the smallest portion of the discharge may occasion acute ophthalmia if applied to the eye, and a mother has been known to be affected when sleeping in the same bed with her child.

The *Treatment* must consist in extreme cleanliness; the affected parts should be washed with soap and warm water at least twice a day; some astringent lotion, such as alum and sulphate of zinc, should be frequently applied. Bitter tonics and the salts of iron are the appropriate internal remedies.

Diabetes Mellitus, Glycosuria, or Saccharine Diabetes,

Is exceedingly rare in children, and, when it does occur, presents exactly similar symptoms as in the adult, and must be treated with the same regard to remedies and diet. The disease is gradual in appearing. There are progressive loss of strength and flesh; voracious appetite; harsh, dry skin. The urine is of a light straw colour; its specific gravity is usually high (1030 to 1050); a large amount is passed daily, sometimes as many pints as normally there are ounces. Pleurisy or peritonitis may supervene, and the case generally terminates with pulmonary phthisis, hectic fever, and diarrhœa, or by convulsions and coma.

Causes.—Diabetes is chiefly present in families with an epileptic or consumptive history. The exciting causes may be damp and cold, excessive use of saccharine articles of diet, and drinking much fluid when the body is heated. It appears to originate in some perversion of digestion and assimilation.

Injury to the spinal cord and brain may sometimes occasion diabetes, which under these circumstances is traumatic.

Diabetes Insipidus, Hysterical or Non-Saccharine Diabetes,

Is recognised by excessive discharge of limpid urine of low specific gravity (1001 to 1007), and destitute of albumen or sugar. The disease may last from birth to maturity, and has been known to come on suddenly after a violent muscular effort. The skin is dry and harsh, and thirst is intense; as many as 15 pints of urine have been passed daily for months. In some cases the symptoms closely resemble those of saccharine diabetes.

This affection appears at times to depend upon intestinal disturbance, but the causes are very obscure. It has resulted from exposure to cold, the action of the skin being checked, and increased action of the kidneys excited; blows and falls, hereditary influence and syphilis, appear to be frequent causes. The pathological change is stated to be some change in the renal capillaries by which an increased amount of watery fluid is permitted to separate from the blood in the same manner as in a paroxysm of hysteria. The Malpighian capillaries of the kidney have been said to be more affected than those of the tubular plexus.

The *Treatment* will embrace valerianate of zinc and tonics generally; iron, ergot, camphor, and galvanism have been tried.

Few remedial measures have proved permanently efficacious, and the disease is usually fatal.

Prolapsus Ani, or Protrusion of the Anus,

Is very common in children, especially amongst the poor. When diarrhœa has been of long continuance, the contractility of the sphincter is lost, relaxation of the surrounding

parts taking place. It may originate in the abuse of purgative medicines, or from the habit of allowing children to strain upon the stool for long periods; habitual constipation may sometimes be the exciting cause, and it may sometimes result from the tenesmus occurring in severe attacks of dysentery.

Treatment.—The relaxed parts should be bathed with cold water. The diet should be regulated; brown bread may be substituted for white. If there be straining after action of the bowels, an opiate enema may be given. The gut, when protruded, may be returned by gently pressing with the finger dipped in oil. Cold water and astringent enemata (infusion of quassia or sulphate of iron) are useful. During the day, to prevent the gut descending, a bandage and compress may be used.

CHAPTER X.

DISEASES OF THE SPLEEN.

These affections are not of frequent occurrence in children, and are more common in the poor; insufficient food, damp houses, and bad ventilation predispose. They may be included under the terms "hypertrophy" and "enlargement."

In consequence of its elastic structure, the spleen is very liable to become distended from trifling causes, and therefore its bulk may be increased by arrest of the action of the skin, or by any hepatic disorder. With a continuance of these disorders the spleen becomes incapable of propelling

the blood onwards, and thus permanent congestion and enlargement result, which may be followed by inflammation and abscess. The size and consistency of the spleen are subject to much variation. In old persons this organ is very much smaller than in the young, and in old age it may waste away, weighing no more than two or three drachms.

Enlargement of the spleen may be due to lardaceous changes affecting the Malpighian corpuscles (sago spleen), constantly seen in children who have died of consumption. In another form of this splenic disease the pulp is the part chiefly implicated. This latter condition appears to be an advanced stage of the former, the affection of the corpuscles extending to the pulpy tissue.

The symptoms of the sago spleen have been described in earlier pages under the head of "Abdominal Tumours."

Ague is a frequent cause of enlarged spleen, and this condition is said to be observed in typhoid fever. Its bulk may be increased by hepatic cirrhosis, or by any other cause obstructing its circulation. Simple hyperæmia may cause it, but enlargement and induration may also result from long-continued congestion.

Acute tuberculosis, obstructive disease of the heart, and pulmonary emphysema, leading to dilatation of the right side of the heart, are other causes of congestion.

An enlarged spleen in connexion with rickets has been seen in a child a year old, in whom the spleen extended to the ileum below, and on the lower border to the umbilicus.

With the progress of splenic disease impairment of the blood takes place, and may give rise to an anæmic murmur over the heart. The spleen may become enlarged when cirrhosis of the liver or any other mechanical obstruction to the venous circulation through the organ is present. In a certain disease of the spleen there is a preponderance of white corpuscles of the blood over the red globules, pro-

ducing the condition known as leucocythemia; this is associated with disease of the lymphatic glands, and with a new growth in the spleen of lymphatic tissue.

The causation of the morbid changes to which the spleen is liable is wrapped in obscurity. It is possible that its turgidity may be dependent upon relaxation of the tissues and of the vessels composing it. Hypertrophy may also be caused by some morbific process in the blood, or from inflammation of the endocardium forming infarctions, from anæmia, from syphilis, or from fevers; but frequently no cause can be assigned.

Enlarged spleen may extend to the umbilicus and epigastrium. In some cases it extends to the iliac spine.

The *Treatment* must be directed to the peculiar symptoms of each case, and may comprise poultices and fomentations if there be pain over the spleen; mild mercurials, arsenic, and quinine if ague be the exciting cause; and ferruginous tonics in anæmic cases.

Ascites, or Abdominal Dropsy,

In children is most commonly occasioned by cirrhosis of the liver, but it may result from greatly enlarged spleen, from tabes mesenterica, or from chronic peritonitis.

In mesenteric disease the enlarged glands may, by their friction, produce irritation of the peritoneum, causing effusion of serum into the peritoneal cavity. According to Day, anæmia and cachexia are not unfrequently causative of abdominal dropsy.

The *Symptoms* of ascites are prominence of the abdomen of greater or less extent, according to the amount of fluid in the abdominal cavity. The swelling is uniform, there is absence of swelling in the upper extremities, and of œdema of the legs. The urine is non-albuminous, scanty, and high-coloured, and disease of the liver exists.

If there is great distension the diaphragm is pushed upwards; there may be impaired expansion of the lower lobes of the lungs, and percussion will yield some dulness in these situations. Percussion is dull over the flanks, and when the child turns over on his side one flank is duller than the other.

The percussion is tympanitic over the anterior surface of the abdomen, varying with the amount of air contained in the intestines, and the sound is clearer according to the height at which the intestines float.

The health gradually fails, the bowels become confined, the urine is scanty and full of lithates, the skin is dry as the abdomen becomes more and more distended, and the superficial veins become blue and tortuous; the child becomes emaciated, and restless at night. In the later stages of the disease, hectic fever sets in and death results from exhaustion.

Ascites may be confounded with ovarian cysts, hydronephrosis, hydatids of the liver, enlarged glands of the mesentery, and hypertrophied spleen.

The *Treatment* will mainly depend upon the causation. The bowels must be kept well opened with pulvis scammonii compositus, or pulvis jalapæ compositus. To produce diuresis, acetate or citrate of potash, digitalis, and scoparium may be administered.

Ferruginous tonics should also be given in every case.

Copaiba is held in much estimation by some authorities, This drug is believed to act both as a diuretic and tonic.

As a last resort, paracentesis abdominis must be performed, but care should be taken that the abdomen is not too much distended before this operation is decided upon.

CHAPTER XI.

DISEASES OF THE HEART.

The heart's impulse in children extends over a larger area than in adults, in consequence of the thinness of the chest parietes. The apex may be felt and seen in the natural position. The outline of the heart becomes more distinctly marked if the ribs project at their attachment to the sternum, and there is depression of the intercostal spaces. The area of percussion dulness is influenced by the shape of the chest, according as it is natural, pigeon-breasted, or ricketty.

It has been shown that the circumference of the heart remains almost the same between fifteen months and six years of age, and that it subsequently increases gradually up to the time of puberty.

The heart diseases in children are divided into two groups:

The Functional, or Temporary; and

The Organic, or Permanent.

FUNCTIONAL DISEASES OF THE HEART.

Syncope, or Fainting,

May sometimes be met with in children of a nervous temperament.

The *Symptoms* are, swimming before the eyes, quivering of the eyelids, singing in the ears, pallor of the face and lips, clamminess of skin, the pulse almost imperceptible and the extremities cold, the child falling to the ground—recovery is indicated by deep-drawn sighs. The attacks may last from a few seconds to a few minutes.

The affection may be caused by loss of blood, severe diarrhœa, acute pain or exhaustion, excitement or shock. In some children the mere sight of blood has produced fainting.

The *Treatment* should consist in placing the patient in the recumbent position and bringing him into the fresh air; cold water may be sprinkled over the face, the dress loosened, and ammonia applied to the nostrils; a little brandy and water may be given.

Palpitation of the Heart

Is characterised by frequent tumultuous movements of the organ, not associated with absolute disease. It may of course at times be a symptom of organic disease. The action of the heart may be seen through the walls of the chest, and violent thumping may be communicated to the hand when applied to the heart-region. There may be considerable constitutional disturbance. As the attack declines, the pulse becomes steady and regular. Males are not so subject to this affection as females. It may be produced by a nervous constitution, severe exercise, violent emotions, indigestion, or loss of blood. It is generally observed in cases of chorea.

The *Treatment* must be directed to removing the cause. Tonics should be given to counteract the debility, and anti-dyspeptic remedies are often indicated. For the relief of pain, a belladonna plaster may be applied to the left side.

ORGANIC DISEASES OF THE HEART.

Pericarditis, or Inflammation of the Fibro-serous Sac containing the Heart.

The symptoms of acute pericarditis in children resemble those in the adult. There may be rigors, general pyrexia; the pulse is hard, small, and rapid; pain may be present, but this is a fallacious symptom, for, although it is sometimes of a sharp, stabbing character, at other times dull and aching, in some cases it is altogether absent; when the attack is rheumatic in origin, pain may result from implication of the intercostal muscles. The countenance is anxious and imploring, and palpitation and irregular action of the heart are not unfrequent.

Endocarditis may in many instances be superadded to the pericarditis.

The pathognomonic sign of early pericarditis is the presence of the to-and-fro friction-sound, *bruit de frottement*, caused by the rubbing together of the inflamed surfaces of the pericardium.

After effusion, the friction-sound ceases. The respiration is hurried, there are dyspnœa, sleeplessness, and great restlessness, and the skin from being hot becomes covered with cold sweat. Convulsions may occur early in young children, and these may be succeeded by delirium and disturbed sleep.

The physical signs are dulness on percussion, increased in extent over the cardiac region, and varying with the amount of the effusion. The apex of the heart may be pushed outwards and upwards if the sac of the pericardium is considerably distended.

In a very severe case the child cannot rest in any position, and wears an expression of intense dread; clammy sweat,

staring glassy eyes, and lividity of face are usually precursory of death.

Causes.—Very rarely occurs idiopathically, but is frequently brought on by acute rheumatism ; it may occur from the extension of pleuritic inflammation or from pneumonia, or may follow scarlatina, measles, kidney disease, or chorea. The affection has sometimes apparently succeeded enlargement of the mesenteric and bronchial glands.

Acute pericarditis may be traumatic (the result of a wound), rheumatic, resulting from rheumatic fever, or uræmic, following kidney disease.

The so-called *Chronic Pericarditis* is nothing more than pericarditis terminating in adhesions.

Stages.—The disease may be divided into (1) pericarditis proper, or the early inflammatory form : into advanced forms ; as (2) Pericarditis with effusion of lymph and serum, or Hydropericardium ; and (3) pericarditis with purulent effusion or Pyo-pericardium, which is exceedingly rare ; 4. A variety known as tubercular pericarditis is sometimes observed, being characterised by the presence of tubercles.

Termination.—(1) In resolution or complete recovery. (2) In adhesions. (3) In purulent effusion.

Pericarditis is frequently fatal in strumous delicate children.

Pathology.—The pericardium is dry and reddened from arrest of the normal lubricating fluid, consequent upon inflammatory action. Then straw-coloured or reddish serum is effused, or pus with coagulable lymph, and adhesions may be found between the opposite pericardial layers. When torn apart, the pericardial surfaces appear honey-combed.

The *Treatment* must consist in the application to the affected side of a mustard poultice, a few leeches, or a blister. Diuretics, aperients, and potash salts may be administered. Tincture of aconite is sometimes useful, and quinine may be given with advantage ; after effusion, blisters

should be applied and kept open by savin ointment; stimulants, brandy or wine, ether and ammonia are indicated if great exhaustion be present.

Endocarditis, or Inflammation of the Lining Membrane of the Heart,

May arise from the same causes and present the same symptoms as in the adult.

It may follow acute rheumatism, scarlet-fever, measles, smallpox, chorea, and Bright's disease, or may be complicated with pericarditis.

The only diagnostic *physical signs* are the presence of *valvular murmurs.*

The *rational* signs are chiefly some pain, shortness of breath, or palpitation. These symptoms are not always present, but appear under conditions of mental excitement or bodily exertion; the murmur or murmurs are, however, always present.

Endocarditis may end fatally by exhaustion or by brain symptoms, or valvular changes may result, the valves becoming puckered up, and their functions impaired, the circulation becoming eventually obstructed and general dropsy supervening. Embolism may occur through the detachment, from the affected valve, of a fragment of fibrine which is carried by the general circulation into the brain.

Ulcerative Endocarditis

Is a term applied to a variety of endocarditis which only affects children of cachectic constitution.

In this form the blood has been infected previously by some specific affection, such as pyæmia, diphtheria, or smallpox, coagula of infected blood forming round the cardiac valve; these clots becoming partially detached, embolism of

an infective nature is superadded to the mechanical effects. The emboli are considerable in number and of a miliary form, and are lodged in the pia mater of the hemispheres, but are not necessarily followed by cerebral mischief. In the ordinary form of endocarditis the emboli are deposited in the middle cerebral artery, and may give rise to hæmorrhage and softening of the optic thalami and corpora striata, leading to hemiplegia; in the ulcerative variety, emboli are frequently found in the intestines, but in both forms they may be found in the spleen and kidneys, the former organ being more or less soft and pulpy.

The endocarditis resulting from acute rheumatism may sometimes become of an ulcerative character, or may even supervene upon chronic valvular affections.

The *Symptoms* in some cases resemble those of enteric fever, but are generally those of pyæmia, viz., local suppurations, rigors, and febrile manifestations of an intermittent or remittent nature.

The affection is usually fatal, and treatment is almost useless.

Valvular Diseases of the Heart

May produce obstruction to the flow of blood through the organ or induce regurgitation of that fluid, leading to pulmonary and other congestion, hypertrophy, and dropsy.

The *Symptoms* are very variable, and valvular disease in children exercises very different effects upon the general health and constitution. The hypertrophy which almost invariably results may counteract the evil effects for some considerable time, but finally venous congestion is occasioned through the heart being unable to relieve itself of the excess of blood thrown into it.

The *symptoms*, however, may include shortness of breath, palpitation, hurried respiration, pain in the cardiac region,

and inability to take exercise. Indigestion and excitement materially increase these symptoms. The valves of the right side are not so liable to be affected as those of the left.

Some children who upon stethoscopic examination may manifest extensive valvular lesion consequent upon rheumatic fever may live for years and experience little or no discomfort, but eventually indications of obstruction to the circulation appear, congestion of the lungs takes place, the digestive organs are affected, and general anasarca sets in.

Mitral Disease

Is the most common form of heart disease in children, and is of two kinds—obstructive and regurgitant. It is not so often met with in boys as in girls.

Mitral Obstruction is recognised by a *presystolic murmur*, loudest at the apex of the heart, viz., between the fifth and sixth ribs, and although it is in some cases traceable along the left margin of the heart to the inferior angle of the left scapula, usually diminishes about mid-axilla. It is frequently accompanied by the so-called *frémissement cataire*, or purring thrill. The pulse is usually small and contracted; and cough, hurried breathing, and pulmonary congestion are not uncommon accompaniments.

Mitral Regurgitation is recognised by a *systolic murmur*, loudest at the *apex of the heart*, and usually traceable along the left margin of the heart to the inferior angle of the left scapula; it is not, however, so frequently accompanied by the purring thrill as in the obstructive form.

Hæmoptysis, pulmonary apoplexy, and congestion may result.

In mitral disease the pulse is usually weak and sometimes intermittent and irregular.

Children may occasionally enjoy fair health and strength, even with a loud mitral murmur, and the functions of the

heart may be little if at all impaired, but in other cases serious results ensue, the lungs and right side of the heart being affected; under these circumstances the subjects of the affection become dwarfed and small, and will probably die eventually from dropsy. They rarely live beyond the age of puberty.

Disease of the Aortic Valves

Is exceedingly rare in children. It may be of two kinds—obstructive and regurgitant.

Aortic Obstruction is recognised by a *systolic murmur*, loudest at the *base of the heart*, at the second right costal cartilage, traceable to the right shoulder and diminishing in audibility toward the heart's apex. The left ventricle in this disease is usually the seat of considerable hypertrophy. The face is generally pale, and from the unfilled condition of the arteries cerebral anæmia frequently results, with the production of severe headache.

Aortic Regurgitation is recognised by a *diastolic murmur* heard loudest at the *base of the heart*, traceable to the right shoulder, but often clearly heard at the apex. The pulse is jerking; extreme hypertrophy accompanied by dilatation often results, but dropsy is very rare.

Tricuspid Disease

Is very rare, but when it does occur in children is usually of the *regurgitant* kind. It may sometimes follow mitral disease of long duration, the pulmonary circulation becoming obstructed, but it is nearly always congenital, and may be produced by dilatation of the right ventricle, by which means the valves are mechanically spread apart.

The indications are increased cardiac dulness to the right of the ensiform cartilage, at which locality a systolic murmur

is heard, occupying a circular area, of which the ensiform cartilage may be taken as the centre. There is also pulsation at the epigastrium. The right ventricle becomes dilated from the accumulation of blood in its cavity. When tricuspid regurgitation is considerable, there is visible pulsation in the external jugular veins.

The *Treatment* of heart disease is very unsatisfactory; but with children the same measures must be employed as in adults, and should consist of light diet, warm clothing, encountering symptoms as they arise, and in the judicious administration of iron preparations and digitalis; all violent movements must of course be avoided.

Myocarditis, or inflammation of the Muscular Structure of the Heart,

Is extremely rare in children, but may result from pericarditis or endocarditis. It may, however, take place in scarlatina or in enteric fever.

The disease may be suspected from the presence of palpitation or from severe pain in the region of the heart (during an attack of rheumatism), spreading to the shoulder or down the arm.

In a fatal case the heart-walls are thickened, and abscesses are observed in the muscular structure. These conditions may result from scarlet fever, pyæmia, and various kinds of blood-poisoning.

The *Treatment* can only be palliative.

Hypertrophy of the Heart

Is of three kinds :—

(1) *Simple Hypertrophy*, in which the walls are thickened, the size of the cavity remaining the same.

(2) *Eccentric Hypertrophy*, or *Hypertrophy with Dilatation*, the walls being thickened and the cavity dilated—the most common form.

(3) *Concentric Hypertrophy*, or *Hypertrophy with Contraction*, the walls thickened and the size of the cavity diminished. This form is by many authors regarded merely as a *post-mortem* change due to coagulation of the blood in the muscular fibres of the heart during the act of dying. In children it is observed especially as a result of disease of the mitral valves, pulmonary emphysema, adherent pericardium, and chronic Bright's disease.

The *Symptoms* are the following : There is a visible slow heaving impulse, sometimes raising the head of the auscultator ; the pulse in simple hypertrophy is full and strong, but its force is much lessened if there is accompanying dilatation. The sounds of the heart are dull and muffled. If the left ventricle is the seat of mischief, the area of dulness is increased laterally and to the left of the sternum.

In the subject of rickets the region of the præcordia is occasionally prominent and rounded. The percussion-dulness may be obscured when pulmonary emphysema is present, since the heart is overlapped by the edges of the lungs. If the right ventricle is the seat of mischief, which frequently happens in cases of long duration, there is pulsation at the epigastrium, and it is possible to feel the edge of the ventricle to the left of the ensiform cartilage.

The left auricle becomes over-distended with blood when mitral obstruction is present, and thus its cavity is enlarged. The left ventricle is usually the seat of hypertrophy, and then

the shape of the heart is globular or rounded. This result commonly takes place in chronic renal disease, and originates in an overgrowth of muscle, arising from obstruction in the capillaries and smaller arteries which the heart is endeavouring to overcome. Contraction of these vessels takes place, and high tension is produced in the vascular system since the elimination of urea and other products of altered tissue is prevented.

Dilatation of the Heart

May be simple, or, as is more commonly the case, may be combined with hypertrophy. The causes of the simple form are general weakness and anæmia, pulmonary emphysema, and bronchitis, and it is frequently associated with disease of the valves.

The *Symptoms* of simple dilatation are rapid, irregular, weak pulse, prominent cervical veins (if the right side of the heart is affected), dyspnœa, dropsy, and tendency to syncope. The impulse of the heart is weak and tremulous, and sometimes almost imperceptible. The audibility of the heart sounds is increased; but since dilatation is usually associated with hypertrophy, the symptoms will be modified according to which lesion preponderates. The *right ventricle* is more commonly the seat of dilatation, and the percussion-area is therefore usually square-shaped.

The *Treatment* must be directed to the particular symptoms of each case.

Cyanosis, or Morbus Cæruleus,

Is of not unfrequent occurrence in children, and is characterised by blueness of the skin and lips, and general coldness of surface. The subjects of this affection are liable to

palpitation, faintness, fits of dyspnœa, hæmoptysis, syncope, and dropsical effusions. A murmur may generally be heard at the point of the abnormal communication.

The *Causes* are usually some malformation of the heart, such as the following:—(1) Permanence of the foramen ovale, permitting the passage of blood between the auricles; (2) Abnormal apertures in some part of the septum of the auricles or ventricles; (3) Origin of the aorta and pulmonary artery from a single ventricle; (4) Extreme contraction of the pulmonary artery; (5) Origins of the large vessels of the heart being transposed, the pulmonary artery arising from the left, and the aorta from the right ventricle; (6) Continued patescence of the ductus arteriosus, allowing the mixture of the bloods of the pulmonary artery and the aorta.

A case is on record of a child nine months old in whom there was extensive disease of the aortic valves. There was no cyanosis at birth, but a short time before death some amount of blueness was present. On examination after death considerable hypertrophy of the left ventricle was present, there was constriction of the aortic orifice, and adherent fibrous vegetations were seen upon the valves.

This disease is usually fatal in early life, but instances are recorded in which adult life has been reached. In one case, indeed, the patient lived to the age of fifty-seven.

The *Treatment* can only be conducted on general principles.

CHAPTER XII.

DISEASES OF THE NASAL CAVITIES.

Ozæna. Fetid Discharge from the Nose.

Symptoms.—The mucous membrane of the nose becomes eczematous and ulcerated, and from its surface an irritating thick discharge takes place. There is thickening and congestion of the membrane similar to the condition in ordinary catarrh. Then follows drying up of the secretion into thick crusts, by which the nasal fossæ are almost closed, creating great annoyance to the child; after the removal of the crusts the surface of the membrane is seen to be ulcerated.

The discharge makes its exit from both nostrils, and is bloody and muco-purulent, of an extremely offensive odour, is very tedious in its duration, and difficult to check. In some cases, upon the patient lying down, congestion and irritation of the larynx may arise in consequence of the discharge trickling into that situation.

There is extreme fœtor of the breath; although the nasal bones may be unaffected, the discharge may become so offensive as to render the sufferer unendurable to others. In this case, however, the presence of diseased bone must always be suspected. There may be throbbing burning pain in the nostrils, and the integument of the nose becomes swollen and red if the discharge is not capable of free exit.

Causes.—Ozæna is met with in delicate children, and it not unfrequently results from a long protracted catarrh; it may follow measles, scarlet fever, and other eruptive fevers, and may also be an accompaniment of scrofula and syphilis. It may even be excited by a blow on the nose.

Varieties.—1. Scrofulous. 2. Syphilitic. 3. Traumatic. 4. Idiopathic.

Scrofulous Ozæna.

A large proportion of cases of ozæna seem to take their origin from scrofula in children. The mucous membranes and the skin are particularly prone to become affected in the strumous diathesis, and thus appear eczematous eruptions, otorrhœa, ophthalmia, bronchial affections, and chronic diarrhœa.

The mucous membrane of the nose becomes swollen and thickened, and is the seat of pustules and small rounded ulcers. This condition is often accompanied by troublesome eczema. The ozæna is rendered abominably fœtid, since the discharge is either pent up in a cavity in which it decomposes, or it may be caused by the presence of a fragment of dead bone.

Syphilitic Ozæna.

Next to scrofula, syphilis is the most frequent cause of ozæna. In this case there are superficial or deep, excavated or sloughing, ulcers, but they are more irregular in outline and fewer in number than in the scrofulous variety. If the bone is affected, the discharge is horribly offensive.

Traumatic Ozæna.

This may follow injury to the nose, or it may be due to the presence of some foreign body, such as beans, peas, buttons, pencils, bits of wood, etc., which children sometimes push up the nose, and thus occasion inflammation and ulceration of the nasal mucous membrane.

The discharge rapidly subsides if the intruding body is removed before the bone becomes diseased.

Idiopathic Ozæna.

This form constantly results from measles and scarlatina. A thin semi-purulent gleety discharge may continue for some weeks. The mucous membrane becomes swollen and red, and may bleed easily on blowing the nose, or even upon an examination of the organ. When the purulent matter is bound up in the sinuses severe frontal headache and sleeplessness at night are occasioned. In some cases the discharge has made a passage into the cranial cavity, or the eye-ball has been displaced in consequence of the sinus becoming so distended as to encroach upon the orbit.

Treatment.—The nasal cavities should be examined by the laryngoscope, after well washing them out with the nasal douche. The nostrils may be dilated by a Fraenkel's speculum.

For *Scrofulous Ozæna* the general health must be looked to. Steel wine, the ammonio-citrate of iron, and cod-liver oil may be administered. The nasal fossæ should be washed out frequently with common salt (half an ounce) and warm water (one pint); or tincture of myrrh (two drachms), chlorate of potash (two drachms), to water (one pint); Condy's fluid (two drachms) to water (one pint), or weak solution of carbolic acid.

Residence at the seaside is to be recommended.

For *Syphilitic Ozæna* mercurials are indicated. The calomel vapour bath must be used. Internally, hydrargyrum cum creta is of great service, and iron, cod-liver oil, bark and iodide of potassium are important. When the bone is unaffected, an ointment of red oxide of mercury (15 to 20 grains), lard and olive oil (each half an ounce), may be employed. The ointment should be applied with a brush after syringing with the nasal douche.

For the *Traumatic Ozæna*, the necrosed bone if present must be removed, and antiseptic washing applied.

In the *Idiopathic Ozæna*, the general health must be improved, and the lotion of myrrh and chlorate of potash may be applied constantly. In some cases glycerine of tannic acid, or the diluted mercurial ointment, will be found useful. In all forms of ozæna carbolic acid is a valuable application. It should be injected along the floor of the nostrils in the proportion of 1 in 40 of water. A diluted solution of iodine, viz., 1 in 30, in some cases is an advantageous injection. In chronic cases an injection of alum (20 or 30 grains to 8 ounces of water) has been followed by good results.

Epistaxis. Bleeding from the Nose.

This form of spontaneous hæmorrhage is probably dependent upon a morbid condition of the walls of the capillaries, such as occurs in hæmatophilia or the hæmorrhagic diathesis. Whooping-cough, catarrh, tuberculosis, splenic diseases, and the exanthemata, predispose to this affection. Immediate bleeding may be excited by a fall or a blow on the nose.

Epistaxis is rare in young children, or in strong, well-developed subjects. Delicate children with thin bones and weak muscles are those who are most liable. The blood may flow in a full stream, or in drops from one or both nostrils. If the bleeding takes place during sleep, it may flow into the pharynx, and thence to the larynx, causing cough, or down the œsophagus into the stomach, inducing vomiting.

Usually the hæmorrhage is rapidly checked by coagulation taking place speedily, but when the blood is thin, coagulation may take place very slowly, the patient bleeding profusely and passing into a condition of extreme anæmia. When the loss of blood has been great and of long duration, the heart becomes weak, there is prostration and faintness, with headache, restlessness, and delirium.

Treatment.—Perfect rest in bed, the posture being semi-erect. Blowing the nose must be avoided if possible—a difficult matter with children. The nostrils should be held between the fingers and cold applied to the bridge of the nose. Iced water may be injected. Powdered alum or ox galls have been successful at times. Internally, sulphuric acid, gallic acid, tincture of the perchloride of iron and ergot are indicated. In extreme cases the posterior nares must be plugged.

CHAPTER XIII.

DISEASES OF THE RESPIRATORY ORGANS.

Simple Catarrh or Coryza.

The mucous tissues in children possess considerable irritability, and are liable to sudden alternations in the quality and quantity of their peculiar secretions; in consequence this affection is of frequent occurrence during the earlier periods of infancy and childhood.

The *Symptoms* commence with sneezing, watery running at the eyes, and mucous discharge from the nostrils. The latter is at first clear and viscid, but it eventually becomes thick, yellowish-green, and finally puriform. The skin is hot and the face flushed. The child sleeps with the mouth open, and whilst breathing he snuffles; this latter symptom is frequently very troublesome, and the Schneiderian membrane may be so tumefied as entirely to obstruct the passage of air through the nostrils, and thus in young infants to interfere with suckling. The above indications may sometimes be the forerunners of some exanthematous affection, such as

scarlatina or measles, and, bearing this fact in mind, it is necessary to be on the watch for the proper eruption.

Syphilis may be indicated by the snuffling, but this disease may be recognised by the coexistence of other peculiar symptoms.

Simple coryza is not dangerous, and no special treatment is demanded.

Draughts of cold air and too much direct light must be avoided. A tepid bath may be administered, and the child subsequently kept warm. A gentle aperient, such as castor-oil, may be advantageously exhibited. In some cases, however, the catarrh assumes a chronic form, and it may seriously interfere with the child thriving, and may even wear it out by interrupting its suckling. In this case efforts must be made to improve the general health, by change of air and of food; asses' milk may be abundantly supplied. The surface of the body should be sponged once or twice a day with tepid vinegar and water. Rhubarb, with grey powder or some other gentle alterative aperient, or a small quantity of ipecacuanha will be found of service. As a local application, a bit of lint wetted with decoction of guaiacum and introduced into the nostrils will sometimes prove beneficial.

Bronchitis, or Inflammation of the Mucous Membrane Lining the Bronchial Tubes,

Is one of the most fatal diseases in young children, in whom the mortality from this disease is very great.

Children, however, are subject to it at any age and in every degree of intensity.

Varieties.—Acute, Chronic, and Plastic.

Symptoms.—The *Rational Signs* of acute bronchitis are mainly dependent upon the extent to which the respiratory tract is implicated. There are: general fever, quick pulse,

hot skin, constipation, or diarrhœa with fetid evacuations, cough of greater or less violence; the temperature is elevated, usually about 102° to 105° Fahr., but it is never so high as in pneumonia; the respirations are frequent (100 to the minute), the nares dilate during inspiration, and occasionally the act of sucking is performed with difficulty; the face may become pale and œdematous, or livid and swollen from defective aëration. In the later stages, a paroxysm of suffocation frequently accompanies each act of coughing, which often terminates in vomiting; at the end convulsions and coma may supervene. In favourable cases the disease usually runs its course in eight or ten days, convalescence generally beginning in five or six days; the fever subsides, the respirations become less frequent, the cough becoming looser, and less suffocative since free secretion is established from the mucous membrane. The expectorated matters in young children are invariably swallowed, but when opportunity is afforded of observing them in older subjects they are found to consist at first of clear transparent mucus, which subsequently becomes viscid, glairy, and opaque, and finally greenish, or yellowish and muco-purulent. The child is always worse towards night-time, and this occurrence in bronchial and other catarrhal disorders is accounted for by the theory that towards night there is a lowering of nerve power, the vaso-motor nerves partaking in the general debility—thus the arteries are allowed to dilate, and increased hyperæmia of the affected parts results, with more abundant secretion of mucus.

Bronchitis may be limited to the large bronchial tubes, in which case the attack is comparatively slight in severity, or it may invade the smaller ramifications and approach nearer to the air cells, in which case it is termed *Capillary*, and it is then frequently of a very dangerous character.

The *Physical Signs* are dependent upon the especial part

of the bronchial tubes involved ; if the disease is confined to the larger ramifications of the bronchi, *Sonorous Rhonchi* will be present ; if the smaller ramifications are involved, *Sibilant Rhonchi* will be heard ; and if the smallest ramifications are the seat of the inflammation, *Mucous Rhonchi* may be distinguished. It must be remembered that all these portions of the tubes may be affected simultaneously, and therefore sonorous, sibilant, and mucous rhonchi may be present together in the same case. The chest, on *percussion*, in uncomplicated cases, will be found resonant throughout, since the lung tissue is then not involved.

When the disease is confined to the larger tubes little constitutional disturbance is occasioned. When it affects the smaller ramifications, much dyspnœa and violent fits of coughing are set up. If old enough, the child will complain of a sense of constriction in the chest. The cough is frequently tearing and hoarse, persisting both during sleep and in waking hours.

In delicate children of a few months old, loud mucous râles may occasionally be heard over the back of the chest, with wheezing on inspiration.

In young children, if loud rhonchi are present, these signs are almost invariably succeeded by moist sounds, and dyspnœa and death may result from the extreme secretion poured out. It is difficult to find the line of demarcation between inflammation of the finer bronchial tubes and that of the vesicular structure.

Bronchitis is very dangerous in children at the breast, and in those under five years of age. The disease is frequently complicated with pneumonia, constituting the disease known as broncho-pneumonia. The capillary forms, and broncho-pneumonia, are very fatal.

Causes.—Cold and alternations of temperature, insufficient

clothing, and the debility arising from suckling beyond a reasonable time.

Bronchitis may arise in children from valvular disease of the heart and hypertrophy, local congestion being induced, and the balance of the circulation disturbed. It may also be associated with albuminuria, tuberculosis, and whooping-cough, and with various exanthematous disorders, especially measles.

Chronic Bronchitis

May follow the acute form, or a neglected cold, or it may be the result of a low form of inflammation. It is a very obstinate affection in delicate children, and may occasionally be accompanied by kidney disease. It is by no means uncommon in ricketty and strumous children. It is frequently kept up by pulmonary tuberculosis, and by valvular disease, or dilatation of the heart, the circulation through the lungs being obstructed, congestion of the ramifications of the bronchi taking place. When it is of long duration, and opposes all remedial measures, the presence of tubercles must be suspected. If occurring during dentition the eruption of each tooth will set up fresh pulmonary irritation. Pulmonary collapse may result from bronchitis.

In Plastic Bronchitis

The tubes are filled with plastic lymph. This form often accompanies or follows diphtheritic diseases of the larynx and trachea. It usually occurs between the ages of 10 and 13, and is more common in male than in female children. In addition to the ordinary signs of bronchitis, attacks of severe hæmoptysis are not unfrequent, and the cases are generally very serious in their character. If the minute tubes are invaded by plastic lymph, the cases are probably

complicated with pneumonia. The indications for treatment are emetics to remove the casts, and iodide of potassium is said to be very serviceable.

Pathology.—In the *Acute form* of Bronchitis the mucous membrane presents increased vascularity, and is generally the seat of some thickening or softening. It may be covered with thin and frothy or thick muco-purulent secretions, according to the duration of the case.

In the *Chronic form* the muscular structure is increased. The mucous and sub-mucous tissues are striated and thickened. The tubes are usually constricted, but occasionally dilatation (Bronchiectasis) is produced.

In the *Plastic form* there is exudation of a false membrane upon the inflamed mucous surface.

Treatment.—In the *Acute form* the child should be kept in bed; sinapisms and linseed-meal poultices may be applied to the chest. At the commencement of the attack a dose of calomel or grey powder may be given with advantage, followed by citrate of potash, or some expectorant as ipecacuanha, squills, or senega; emetics may be given to relieve excessive secretion; carbonate of ammonia is serviceable in cases of exhaustion. Inhalations of steam and medicated vapours are useful, and a warm bath towards evening may be given with benefit; quinine in small doses is recommended by some authors.

In the *Chronic form* sinapisms and stimulating liniments may be applied, or the chest may be painted with iodine. The cough may be controlled by bromide of potassium and belladonna. If the râles persist, gallic and tannic acids may be exhibited. When the cases are of very long duration benefit may be derived from the administration of cod-liver oil and the hypophosphites of soda and lime.

Pleuritis,

Pleurisy, or *Inflammation of the Pleura* (the membrane investing the lung and walls of the thorax), is rare as a primary disease during the first five years of life; it may arise with tolerable frequency as a secondary affection during the course of scarlatina, acute desquamative nephritis, pneumonia, and rheumatism; it is occasionally latent, co-existing with other pulmonary diseases, during the course of which its presence is frequently overlooked.

Stages.—1. An early or dry stage. 2. An advanced or effusive stage.

Varieties.—Acute or Dry Pleurisy; Chronic (*a*) with serous effusion or Hydrothorax; (*b*) with effusion of pus or Empyema.

Symptoms.—The *Rational Signs* of the early stage are depression, loss of appetite, and in older children rigors; there is acute lancinating pain in the affected side, increased by inspiration, coughing, pressure or lying upon that side. The pain is often referred to the abdomen and not to the chest, and is then attended by purging and bilious vomiting, especially when the inflammation occurs upon the right side, and when its origin is diaphragmatic. The pain, however, varies in intensity; it is much less severe in some cases than in others, and may at times be entirely absent. The affection may commence with headache and delirium; dyspnœa and febrile symptoms may be present, but they are far less marked than in pneumonia; there is short dry cough, the pulse is wiry, *i.e.*, hard, small, rapid, and tense; the face is sometimes flushed, the countenance anxious and imploring; the skin is hot, and the tongue white and coated.

Dyspnœa is frequently present in the early stages of pleurisy, when the pain in the side is severe, and even before the occurrence of effusion; the lung is not completely

inflated by a full inspiration, since this effort intensifies the pain occasioned by the movements of the walls of the thorax, and the respirations are also increased in number by the pyrexia which is present.

In the first stage, since the pleura is inflamed and dry, the mobility of the affected side will be diminished, owing to the pain caused by inspiration.

The child usually lies on his back; he cannot lie on the affected side in consequence of the friction and the pain thus created, and by lying on the sound side extra work is thrown upon the uppermost lung, which requires rest, its pleura being inflamed. The patient will, however, assume that position in which he is able to breathe with the greatest ease, and by which the sound lung is allowed the greatest freedom.

The *Physical Signs* of the early stage:—

The *Percussion* note is normal, or only slightly diminished. The respiratory murmur is indistinct and weak, and a *friction sound* is heard, caused by the rubbing together of the opposed pleural surfaces. This sound disappears after adhesion of the surfaces takes place, or when much effusion is present.

At the commencement of the effusive stage, when only a thin layer of fluid is present in the pleura, the peculiar modification of the voice termed "*Ægophony*" may be heard; but, as the effusion increases, this sound disappears, and the movements of the chest-walls on the affected side are diminished, varying with the amount of fluid poured out. With considerable effusion there is bulging of the lower part of the chest-wall; the affected side may be more or less generally enlarged, the ribs are widely separated, and the intercostal spaces obliterated. With small effusions the vocal fremitus is diminished; in large ones it is altogether absent. When the effusion is extensive, the liver, spleen,

diaphragm, and heart may be displaced, and the last-named organ may be seen to pulsate out of its normal position.

When extensive effusion occurs in children with thin chest-walls, fluctuation may be observed between the ribs, and enlargement may be found over the superior ribs on the side affected. The effusion may be considerable without any increase in the affected part; a large amount of fluid may be present without causing the side to be larger; even when many ounces are present, the diseased side may only measure one inch more than the healthy one.

In children the ribs act with greater freedom, and the muscles and ligaments are easily stretched, and, in consequence, the degree of bulging of the affected side is far greater than in adults.

The *Percussion* over the effused fluid is absolutely dull, but may be altered by the patient changing his position.

Upon *Auscultation* no voice sounds can be heard over the seat of effusion.

The friction-sound is frequently overlooked in the pleurisy of children, and sometimes the earliest indications are diminished vocal fremitus, deficient chest expansion, dulness on percussion, and bronchial breathing.

In some cases effusion may be accompanied only by quick breathing and debility.

Diagnosis is comparatively easy in the early stage, but difficult after effusion has taken place, especially if the case is complicated with phthisis, bronchial congestion, or broncho-pneumonia. According to Dr. West, a case may be recognised as pleurisy when sudden and severe symptoms of pneumonia are present, but no fine crepitation can be heard on auscultation, only feeble respiration being present on one side, and bronchial respiration on the other.

The prognosis is favourable when the constitution of the patient is good; but, if the child is delicate and ricketty, or

the disease is complicated with phthisis, or much debility is present, the case must then be regarded as very unfavourable.

Causes.—Cold and exposure, rheumatic fever, the exanthemata, as measles or scarlatina, pericarditis or phthisis. In rare cases pleurisy has followed peritonitis.

Terminations.—In resolution, or in adhesion of the opposed pleural surfaces; in effusion of serous fluid (hydrothorax); in effusion of pus (empyema).

Pathologically, the appearances are the same as those found in the adult. The pleuræ are at first smooth, pale, and semi-transparent, or they may be finely injected, or adhesions may be found between the pleuræ, with effusion of serum, which is sometimes clear, occasionally reddish, and sometimes consists of sero-purulent fluid containing flakes of lymph.

Pleurisy has been observed, on *post-mortem* examination, in the youngest children. The lung may be compressed according to the amount of the effusion. If a considerable amount of fluid is present, the chest dimensions may be increased, and the lung may be squeezed against the vertebral column, its tissue appearing tough and leathery.

Hydrothorax,

Or *Chronic Pleurisy*, as it is sometimes called, may result from the acute form, or from pleuro-pneumonia, the effusion being slow to absorb, or resisting absorption entirely. The effusion may become permanent if the health is seriously impaired, and recourse must then be had to an operation. It cannot always be traced to acute pleurisy, and it occasionally creeps on imperceptibly in delicate subjects. It may accompany the dropsy of scarlatina and of kidney disease, or the anæmia of ill-fed strumous children; a low form of pleuritic inflam-

mation, which leads to abundant effusion, may be induced by the irritation of tubercle. The symptoms are the same as those of previously-described pleurisy in the effusive stage.

Empyema,

Or *Effusion of Pus into the Pleural Cavity*, is exceedingly common in children. It may be suspected from the presence of fever symptoms, delirium, and profuse sweats, and from the fact of the effusion having remained unabsorbed; the time occupied for the serous fluid to pass into pus is subject to much variation. When an attack of pleurisy is about to terminate in empyema, an apparent convalescence frequently takes place after the more acute symptoms have disappeared; a sudden and severe attack of dyspnœa, however, appears, and the child now lies on the affected side.

On *Physical Examination* of the chest the respiratory murmur is diminished; and, if the quantity of fluid is very considerable, no vesicular breathing at all can be heard, but bronchophony and bronchial breathing may be present. If no air is able to enter the lung, *Percussion* yields a dull characteristic thud, and the chest-movements are notably decreased. The healthy side is the seat of intense puerile respiration, since the lung of that side has to perform double duty.

If left to itself, an empyema may dry up and become absorbed; the pus has occasionally emptied itself into a bronchus, or, in rare instances, passed through the diaphragm into the peritoneum, and set up fatal peritonitis.

Treatment.—In *Acute Pleurisy* the child may be enveloped in a large jacket poultice. With a strong, healthy child a few leeches may be placed on the side and a saline

diaphoretic administered, such as acetate of ammonia or nitrate of potash combined with a little antimonial wine; a grain of calomel combined with the compound ipecacuanha powder is beneficial. The regimen should be antiphlogistic.

In *Chronic Pleurisy* the diet must be liberal; good food and wine should be given. Blisters may be applied from time to time. The chest may be painted with iodine. Iodide of potassium, bark, squills, digitalis, and acetate of potash may be exhibited internally. In anæmic children, tonics, such as quinine, strychnia, the various preparations of iron and cod liver, may be administered.

When the process of absorption fails, the lung becoming seriously compressed, giving rise to urgent dyspnœa, the pulse being irregular, the heart feeble, or the fluid becoming fœtid, and great constitutional disturbance occasioned, the patient being in danger from hectic fever and septicæmia, the operation of *paracentesis thoracis* is demanded, and care should be taken that this operation is not delayed too long.

The following are the cases calling for paracentesis:

1. Those cases in which the fluid is so abundant as to fill one pleura and induce compression of the lung of the opposite side.

2. Cases of double pleurisy, in which the whole amount of fluid may probably occupy a space equal to the capacity of the two pleural cavities.

3. Cases in which the amount of effusion has given rise to one or two attacks of orthopnœa.

4. Cases in which a large effusion has existed a long time (a month or so), and in which there has been no indication of progressive absorption.

5. In every case in which the contained fluid is suspected to be purulent, an exploratory puncture should be made, and the fluid evacuated.

After the operation has been decided upon, it is usually a good measure to make a preliminary puncture with a grooved needle; the usual place for penetration is the intercostal space between the 5th and 6th ribs, posterior to their angles; an incision must be made about an inch in length through the skin and the muscle, and the trocar then plunged into the pleura. When a drainage tube is employed to carry off the pus as it forms, an eyed probe should be passed into the opening and caused to project at an intercostal space, as low down and as far back as possible. It should then be felt for, and cut down upon; a piece of silk is attached to the eye and drawn through the wound, and the two ends of the tube united.

The best plan is to use an aspirator, by which means the pleural cavity may be emptied and closed without any air being admitted—a piece of isinglass plaster covered by a small lint pad and fastened by a bandage may be placed over the wound. If the pus is fœtid, a drainage tube may be introduced; various injections have been recommended, to be employed after the operation, such as a watery solution of iodine or a weak solution of carbolic acid. Before performing the operation it is always advisable to place the child under the influence of some anæsthetic.

CHAPTER XIV.

ASTHMA,

Or *Spasm of the White Muscular Fibres of the Bronchial Tubes*, is of rare occurrence in children, but a few cases have been observed. It is very seldom seen under ten years of age; but there is on record a case of four years old, which followed scarlatina, and was benefited by a bracing air.

Trousseau mentions a case of asthma occurring in a boy of five years, who suffered from attacks of gout, alternating with this affection.

Causes.—The disease is usually hereditary, and may be found in the offspring of hysterical parents, or those of a highly nervous organisation. It may follow whooping-cough (being caused by the straining efforts), or measles, or bronchitis, the lungs being probably damaged in such a manner as to predispose to asthma, the sensibility of the mucous membrane being abnormally increased, and thus undergoing some unappreciable pathological alteration. It may in some cases be caused by irritant particles, as dust, bad smells, or by cold air; by certain particular odours, as hay, ipecacuanha, scammony; or by the scent of some flowers, as violets. It may sometimes be occasioned by indigestible articles of diet, such as nuts or cheese, reflex spasm of the bronchial tubes being excited by irritation of the pneumogastric nerve.

This affection sometimes takes place without any apparent cause. It has followed a severe attack of indigestion and vomiting, the asthma having commenced immediately after the cessation of the vomiting.

Asthma is also stated in some cases to arise from pul-

monary œdema and albuminuria, and to be an occasional accompaniment of some kinds of Bright's disease.

Symptoms.—As in the adult, the child may go to bed apparently well, and will be roused in the middle of the night by an attack.

The general symptoms of cough, however, usually precede the asthmatic paroxysm in children. There is intense dyspnœa and sense of suffocation, great anxiety, and eagerness for plenty of fresh air; the countenance is anxious and imploring, and the face livid; the patient will run to an open window; the clavicle and thorax are fixed and drawn upwards; the inspiration is convulsively violent, the expiration prolonged and comparatively easy, both acts being attended by wheezing. The respirations may number sixty or seventy per minute. The diaphragm is raised, producing retraction of the epigastrium; sonorous and sibilant rhonchi may occasionally be heard, in consequence of the spasms producing rigidity of the bronchial tubes, but these physical signs disappear directly after the attack is over.

In a mild case the paroxysm may last for about half an hour, in a severe one from two to three hours; and, after passing off, the child will be apparently well in all respects. At the end of the paroxysm the urine is turbid and scanty, but during the fit it is clear and abundant. The interval between the attacks is very uncertain, but it may vary from weeks to months, and, very exceptionally, years.

When asthma has been of long standing, it will in all probability lead to emphysema.

Some asthmatic seizures may possibly originate in the irritation of teething. Age and constitution greatly influence the prognosis. The tendency in a young subject is nearly always towards recovery, the nervous irritability in children usually lessening as the child grows older.

Asthma may, however, be a symptom of heart disease or

emphysema, and spasmodic attacks similar to this affection may arise from the pressure upon the pneumogastric nerves of enlarged bronchial glands.

When a case tends to a fatal termination, it usually does so by obstruction to the circulation, leading to organic pulmonary and cardiac lesions.

Pathology.—Upon *post-mortem* examination, in an uncomplicated case of asthma, no definite morbid appearances may be detected. The disease is essentially a neurosis, and consists in a spasmodic contraction of the muscles surrounding the bronchial tubes: sufficient air is unable to pass into the lung-tissue so as duly to aërate the blood, and the inspiration consequently becomes difficult. The smallest bronchial tubes are now almost universally admitted to contain circular muscular fibres, and, undoubtedly, contraction of these muscles may be caused by irritation of the par vagum.

Persistent rhonchi, consequent upon catarrh, may occasionally be heard in the lungs of delicate, nervous, ricketty children; these physical signs are, in reality, due to a pulmonary neurosis, in which excessive secretion is poured out into the bronchi, but there is no accompanying inflammation in these situations.

It is highly probable that constantly repeated asthmatic attacks will lead to thickening and permanent constriction of the bronchial tubes with co-existent hypertrophy of their muscles.

Treatment.—The sleeping apartment of the child should be large, and into which plenty of fresh air can be admitted, especially during the night.

Expectorants, as ipecacuanha, are useful in many cases.

Certain districts appear to exercise a beneficial influence in some cases. Some asthmatic subjects cannot reside in London, and some only in certain localities. Inhalation of

the burnt fumes of nitrate of potash papers are especially serviceable, and in some cases the powdered leaves of dry belladonna or stramonium leaves may be sprinkled on these papers, if the effect of these by themselves should be insufficient. Smoking stramonium has long been a popular remedy.

Belladonna combined with bromide of potassium has found favour with many physicians.

Amongst the numerous remedies that have been employed are hydrate of chloral, coffee, arsenic, nux vomica, perchloride of iron, chloroform inhalation, and pilocarpin.

Attention to diet is a very important measure; this should be very light and digestible. The quantity of fluid administered should be small, and stimulants are, perhaps, best avoided. Slight purgatives are often useful, and daily exercise for a short time in the open air is highly necessary.

Emphysema,

Or *Over-distension by air of the Air Cells and Interlobular Substance of the Lungs*, is of not unfrequent occurrence in children.

Varieties.—It is termed *Vesicular* when the affection is limited to the vesicles or air cells, no air escaping into the connective tissue of the lung, in which case it might more accurately be called *Pulmonary Rarefaction.*

Interlobular is the name applied when the interlobular tissue is also involved, air being extravasated between the lobules and beneath the pleura.

In the former variety the air cells alone become dilated and the walls ruptured, so that many cells become merged into one; in the latter variety, the air escapes from the air cells into the interlobular connective tissue, which also becomes distended.

Causes.—In children emphysema usually originates during the course of some pulmonary affection, and may occur, as it were, in an acute form. In some cases rachitic disease of the thorax may produce embarrassment of the respiration, and thus lead to asthmatic attacks and to an emphysematous state of the lungs which has gradually developed during a very early period of infancy. In these cases congenital weakness of the pulmonary tissue is probably present, and if the deformity of the thorax is removed and the constitution improved, as frequently happens, the elasticity of the lungs may be re-established, and the emphysematous indications in a corresponding degree diminished.

More or less marked emphysema of the lungs is frequently observed in children who have died of acute pulmonary lesions; it is consequently extremely probable that this affection may be often developed to a greater or less extent during the progress of many cases which have recovered, the pulmonary tissue subsequently acquiring its normal condition.

Vesicular emphysema frequently follows thoracic diseases in children, but is not so frequent in children as the interlobular form, which, however, may attain a degree of severity rarely observed in adults.

Subcutaneous Emphysema, resulting from the rupture of some small air vesicle or bronchiole, is almost entirely confined to childhood.

Emphysema may result from laryngealor pulmonary disease, such as pseudo-membranous croup, simple bronchitis, the bronchitis of measles, and especially whooping-cough.

The mode of development of pulmonary emphysema has been variously accounted for.

Two theories are advanced, the *Inspiratory* and the *Expiratory*—some believing that the affection is caused by

the forces of inspiration; others by those of expiration. The latter view is fast gaining ground since the fact has been established that in *forcible* breathing the expiratory power is at least one-third greater than the inspiratory. Violent inspiratory forces have been stated to be sufficient to produce emphysema by simple extreme inflation of the lungs. In a normal free expiration the air is impelled from the lungs by a moderate and gradual pressure, which the weakest portions of the thoracic walls are capable of supporting, but if the expiratory efforts become violent, air is impelled with much force from the basic, lateral, and central parts by the compression of the thorax and ascent of the diaphragm, while the outward current from the anterior margin and apices is feeble in comparison. When, then, by some means there is disturbance of the normal relations between the calibre of the large bronchi and the expiratory current of air, that portion of air which is unable to escape is forced violently into the anterior margins and apices, overcoming the outward current of air passing from these parts of the lung, and in addition inducing extreme distension of the air vesicles.

This disturbance may be caused either by obstruction in the air passages, free escape of air being prevented, or by a sufficiently violent and sudden expiratory act so that the volume of air driven forcibly into the vessels is too great to proceed freely through the primary bronchi.

Symptoms.—The rational signs are, dyspnœa, increased by going upstairs or walking fast; this symptom is, however, far less urgent in children than in adults.

The face is dusky and cyanotic in protracted cases. There is anæmia, loss of strength and flesh.

The pulse is weak, and slow, like the respiration, the hands and feet are cold, and the fingers blue. Headache and drowsiness are frequent; occasionally there is much

wasting. The abdomen becomes large, and the liver and spleen are increased when the disease is confirmed.

If dropsy supervene, tricuspid regurgitation is usually present, and the jugular veins become swollen and pulsate visibly. When a case is of recent date and associated with whooping-cough there is puffiness and blueness of the lips, a watery injected condition of the conjunctivæ, elevation of the clavicles. The entire thorax is raised and barrel-shaped, the obliquity of the ribs being lost. There is widening of the intercostal spaces, and curvature of the spine, with the concavity forwards.

The most characteristic indication is the respiration; the child leans forward in bed, the hands are folded, the shoulders are rounded, and the neck-muscles brought into powerful play. The lower part of the thorax is drawn in, the abdomen being flat, and in some cases even concave, the upper parts of the chest are nearly fixed, since the lungs are little altered by inspiration, as they are expanded to the utmost. In some cases, however, the respiration varies, for the thorax may be elevated, the muscles of the abdomen expanding forcibly, since the expansion of the chest is diminished. The inspiration is hurried and short, and the expiration is prolonged and wheezing, from diminished elasticity of the lungs. Spasmodic fits of coughing are apt to occur when the case is complicated with bronchitis.

In children under five or six years of age the emphysema is rarely of sufficient duration, or attains intensity enough to lead to any marked alteration in the thorax; but in older children symptoms similar to those in the adult may be present.

Mild and summer weather alleviate the affection, which is intensified in the spring and winter, and some cases find relief in a dry and bracing climate.

Physical Signs.—When limited to small areas hardly

any physical signs are apparent; but in more severe forms there is bulging of the whole chest, the circumference of the thorax being increased, and the ribs more horizontal. There is widening of intercostal spaces, and the lungs are larger, since the air vesicles are distended.

On *Percussion* the whole chest is tympanitic, in consequence of the stationary air in the distended vesicles, but it is especially so along the line of the sternum, at which the edges of the lungs approximate.

On *Auscultation*, the vesicular murmur is obscure and distant.

In long-standing cases the heart may become dilated, tricuspid regurgitation is caused, and epigastric pulsation may be visible.

Terminations. — When emphysema is associated with whooping-cough it may gradually disappear with that affection, but when accompanied by asthma, or organic changes in the heart, it is permanent, and recovery is impossible. Tuberculosis is sometimes associated with emphysema.

Pathology.—In the *Vesicular* form, the apex and anterior border of the lung are generally most affected, and to these parts the disease may be limited; but it is sometimes seen involving, to a greater or less extent, the base and whole surface of the lung. It is often much more extensive on one side than the other. The affected part is usually notably enlarged, and if both lungs are extensively implicated, they project forwards, their anterior borders nearly approximating. Upon opening the thorax, the emphysematous parts do not collapse, the lungs are bloodless, pallid, and dry, and yield a doughy sensation to the finger on pressure, and they crepitate only imperfectly. The dilated vesicles appear upon the surface, presenting spaces of the size of a millet seed.

When the right lung is the seat of considerable emphy-

sema, the liver is generally depressed. The heart may be pressed downwards and to the right side when the anterior portions of the left lung are affected. When both lungs are involved, considerable distension of the thorax takes place, it becomes more rounded in its antero-posterior diameter, and shorter, and the course of the ribs is more horizontal, since their curve is increased.

In the *Interlobular* or *true emphysema*, the size of the lung is comparatively little altered, and therefore little influence is exerted upon the shape of the thorax or the neighbouring viscera. Those cases in which the pleuræ are raised from the surface of the lung by emphysema are usually associated with whooping-cough, and the apex of the lung may be greatly implicated, marked swelling of the neck being occasioned by extravasated air in the areolar tissue. Here the air cells are movable, prominent, and round, and may be squeezed from place to place between the lobules.

At a recent post-mortem examination at the North-Eastern Hospital for Children of a child of 13 months, limited areas of emphysema were found, chiefly at the base of lungs and at their anterior margins. The bubbles were perfectly evident. Portions of the lung were nearly solid with pneumonic consolidations, but the other parts were healthy. The only symptoms during life were otorrhœa, rhinorrhœa, and slight cough.

Treatment.—The disease, of course, admits of no repair, but in recent and slight cases constitutional remedies are the chief indications, since, by these, degeneration of the lung tissue may be retarded. Tincture of the perchloride of iron or of the acetate of iron and strychnia are recommended. If complicated with bronchitis, ipecacuanha, acetate of ammonia, carbonate of ammonia, senega, or squills, may be of service; iodide of potassium is also stated to favour secretion when the mucous membrane is dry; a

grain of calomel sometimes does good. The cough may be alleviated by sedatives and sedative inhalations, as the vapour of chloroform, conia and nitrite of amyl, these remedies being applied to a piece of sponge and inhaled from a suitable vessel. The diet must be generous, gentle exercise should be enjoined, and a change of air often confers benefit.

CHAPTER XV.

Pneumonia,

Pneumonitis, or *Inflammation* of the substance of the lungs, is of frequent occurrence in children, and occurs under three well-marked forms, viz. :

1. *Acute, Lobar, Plastic*, or *Croupous* Pneumonia.*
2. *Lobular*, or *Catarrhal* (*Broncho-Pneumonia*).
3. *Chronic, Interstitial, Cirrhotic*, or *Fibroid Pneumonia.*

Acute Lobar Pneumonia is a serious disease in children; even when unaccompanied by cardiac or renal disease it is a dangerous and formidable affection in early life, especially in delicate subjects, since the urgency of the dyspnœa and the embarrassment of the pulmonary circulation soon lead to coma and death when both lungs are inflamed, and in

* This word although commonly used in Medical works in connexion with pneumonia, is utterly absurd, because "croup" is only a generic term for several different diseases affecting the larynx and trachea.

some cases even when the functions of only one are arrested. As in the case of adults, three *stages* may be distinguished:

1st Stage. *Engorgement*, *Hyperæmia*, *Congestion*, or *Splenisation.*
2nd Stage. *Consolidation*, or *Red Hepatisation.*
3rd Stage. *Purulent Infiltration*, or *Grey* or *Yellow Hepatisation.*

Inflammation of the lungs may be either primary or secondary. One variety of pneumonia in young infants arises from a stagnation of blood in the lungs, and is not due to any influence from atmospheric changes; it is usually observed in poorly nourished children, and is especially apt to take place in children lying for a long time on their backs.

Causes.—Among the *predisposing* causes are the tendency to pulmonary disease and the previous condition of health; among the *exciting* causes are: exposure to cold, especially after or during the course of the eruptive fevers, destitution, congestion from renal or cardiac disease, or from phthisis, and injury to the chest, leading to abscesses in the chest parietes. Pneumonia may also result from the extension of bronchitis or pleurisy.

Pneumonia may be complicated with bronchitis, pleurisy, or emphysema. The form termed broncho-pneumonia is very common. In fact, pneumonia is rarely fatal *per se*, but is usually so by complications, such as pleuro-pneumonia or broncho-pneumonia.

Symptoms—Rational Signs.—The onset of pneumonia varies in different cases. There may be feverishness, the skin pungently hot, headache, urine scanty and high-coloured, quick pulse, anorexia, thirst, constipation, dull aching pain in the side, short dry cough, and often vomiting; the tongue

is very dry, red at the edges and tip, and furred and white in the middle. The hurried breathing may prevent the babe from sucking properly; it seizes the nipple, sucks greedily for a few minutes, then drops it, gasping for breath. The tongue is remarkably dry, since the child constantly keeps the mouth open to gain more air.

After a day or two the cough may become looser, and some rusty-coloured sputa may be expectorated, but in infants the sputa are almost invariably swallowed, and in children of eight or ten years old there may not be the smallest trace of expectoration. Subsequently the symptoms may subside, and in favourable cases convalescence may occur in from 10 to 14 days. The patient almost always lies on the back.

Sometimes the attack of the disease is sudden, the child waking in the middle of the night with a bounding pulse, burning skin, flushed face, and hacking cough. This train of symptoms is not usually observed in children at the breast, but occurs in those a few years older.

An attack of pneumonia in children is sometimes ushered in with convulsions, especially if the inflammation attacks the apex of the lung. In adults the inflammation usually selects the *base* of one lung, but in children it may occur in the *middle lobe*, and the disease is not unfrequently confined to the *apex;* this last-named situation is liable to be affected in very young children, and the disease is then likely to be mistaken for consumption. The fact of the apex being the seat of inflammation must be regarded as an indication of cachexia or delicate constitution. If the pneumonia is severe, there may be distension of the right-heart cavities, and pulsation may be observed at the epigastrium. When the apex of the lung is inflamed, the respiration is more gasping than when the other parts of the organ are involved. In the first stage the ordinary number of respirations varies

from 30 to 50 per minute, the pulse varying from 150 to 160; in the latter stages the respirations may vary from 50 to 80 per minute. A very fatal sign is the mouth remaining open with the angles drawn outwards and downwards.

When the disease passes into the second stage, the cough, from being hacking and short, becomes painful and urgent, the breathing is very rapid, and twitching of the alæ nasi is observed; this last symptom is very characteristic. The skin is very hot, the average temperature being 104° Fah.

If the disease passes into the third stage, symptoms of exhaustion present themselves, such as irregular breathing, sunken face, cessation of cough, clammy sweats, pulse rapid, small, and difficult to count; convulsions and coma and obstinate diarrhœa usher in the fatal result.

Physical Signs.—In the *first stage*, on *Auscultation*, *fine crepitation* may be heard, but this is not nearly so definite as in the adult; even when seen very early there may be little change in the respiration, and in most cases when the general symptoms have become of any prominence some dulness on *Percussion* will be found over the lung.

If the physical signs continue, the fine or small crepitation is replaced by a coarser variety, which is termed *sub-crepitant rhonchus*, the air vesicles being now dilated and impaired by the pressure of more abundant fluid. In children, the duration of fine crepitation is very brief, and it is rapidly succeeded by the coarser sound.

If recovery or resolution takes place, the crepitation becomes moister and the respirations less frequent, and softer.

In the *second stage*, there will be dulness on *percussion*, and on *auscultation* bronchial breathing and bronchophony with increased vocal fremitus will be heard.

In the *third stage*, the *percussion* will still be dull, and on *auscultation* mucous gurgle is audible.

If the disease should terminate in gangrene, which is rare,

there will be hectic fever, profuse sweats, intense fœtor of breath, and death may rapidly ensue from exhaustion.

Terminations.—In otherwise healthy children the disease may end in resolution or recovery, which may be expected at the end of a week or ten days; sometimes, however, during apparent convalescence a relapse takes place, and the patient may succumb to convulsions, or be asphyxiated, in consequence of the pulmonary artery being obstructed, and the circulation through the lungs impeded. In other cases, the exudation never becomes absorbed, and it may be followed by pulmonary phthisis.

In badly-nourished and delicate children one or more abscesses may be formed, which may burst into the pleura or bronchi; or, by absorption of their fluid portions, they may dry up, and become the seat of calcareous deposit, being enveloped by a firm membrane. In other cases, contraction of the fibrinous exudation may take place, giving rise to cirrhosis of the lung, or fibroid phthisis.

Pathology.—In the *Engorgement* stage the colour of the lung is reddish-brown, or mottled, or livid; it is termed *splenisation*, since, like the spleen, it can be easily torn. Some portions of the organ float on water, and others sink, since they contain a very small quantity of air; upon section, frothy and bloody viscid serum exudes.

In the *Red Hepatisation* stage the lung is increased in weight, and does not crepitate on pressure; the amount of fibrinous exudation renders it more solid and distended. The external surface is of a deep red colour, and on section it is marbled, or greyish; it also presents a characteristic granular appearance. The cut surface at times resembles a piece of liver. On pressure, only a little thick, reddish fluid, destitute of air, escapes. The lung sinks in water, and its spongy character is entirely lost.

In the *Grey* or *Yellow Hepatisation* stage the lung is paler,

greenish-yellow, or light slate grey, in colour. It sinks in water, and the air vesicles are filled with inflammatory exudation. It is pulpy and soft, and on pressure breaks down; on section, a considerable amount of yellowish-grey fluid escapes, and the entire lung may be infiltrated with pus. In rare cases this stage may terminate in abscess or gangrene. The grey colour is due chiefly to the natural pigment it contains, and therefore in old people, in whom more natural pigment is present, the hepatised lung is much darker than in children, in whom pigment is almost absent; in consequence, in the latter the hepatised lung may be white, or yellowish-white.

The alveoli are filled with exudation consisting of fibrine, and exudation-cells (leucocytes), which soon undergo fatty degeneration. The whole lung, or one lobe, is consolidated, the consolidation being termed massive, in contradistinction to the catarrhal or lobular form of pneumonia, in which the inflammation presents itself in disseminated patches.

Treatment.—Two types of pneumonia are observed in practice, the one sthenic or plethoric, the other asthenic. These demand different handling.

The former is at the present day comparatively very rare, the large majority of cases being of the latter kind.

The sthenic form may require blistering and leeches, with depletory remedies, such as mercurials and antimonial preparations. The asthenic form will derive benefit by the application of jacket poultices of linseed-meal, *i.e.*, encircling both the back and chest of the patient; the linseed-meal should have the oil crushed in it, and a little oil should be smeared over the surface of the poultice. These poultices should be tolerably thick, moist, thoroughly warmed, and frequently changed. Decoction of poppies may be used in the place of water for forming the poultice, if severe pain is present. Internally, aconite preparations, ipecacuanha,

citrate of potash, acetate of ammonia, spiritus ætheris nitrosi, and senega, may be administered. The strength should be supported by strong beef-tea, eggs, and milk, and, if the exhaustion be very great, carbonate of ammonia, brandy, or port wine, may be exhibited. If the sputa be viscid, and the urine cloudy, alkalies are indicated. For want of sleep, hydrate of chloral may be employed, and it is advisable to combine this drug with belladonna, by which the enfeeblement of the vaso-motor system, and the diminished activity of the respiratory centres, caused by the chloral hydrate, are obviated. The above-named drugs, especially aconite and hydrate of chloral, must be very cautiously administered. Bromide of potassium is a safer remedy than chloral, since it exerts a sedative influence upon the nervous system by depressing the action of the heart.

During convalescence, cod-liver oil and iron preparations are the appropriate remedies.

Lobular, or Catarrhal Pneumonia,

Or *Broncho-Pneumonia*, is a more frequent and more serious disease in children than the lobar form; its mortality is also far greater. It is usually double, affecting both lungs, and is frequently more extensive on one side than on the other; it is more common in children under five years of age. It is almost always preceded by bronchitis. Here the inflammation is limited to isolated patches, single lobules, with the surrounding bronchi, being usually alone involved.

Symptoms.—These are more uncertain and obscure than in the lobar variety.

The *Physical Signs* are very imperfect, and may even be entirely obscured by the sounds produced in the healthy tissue, since the disease essentially consists in the dissemination of inflammatory patches through the healthy parts of

the lungs. The *Rational Signs* must therefore be chiefly relied upon. These are almost identical with those of the lobar form, and only differ in respect of the severity of the dyspnœa and the pain.

It is stated that the temperature is characterised by irregular remissions and exacerbations. Pain may be much less severe than in lobar pneumonia, and in some cases may be entirely absent. When the inflamed patches are superficial and numerous, pain may be present, but it is generally slight, diffused, and experienced only during full inspiration or in the act of coughing. If the patches are situated in the central portions of the lung, pain is altogether absent. Cough is present in most cases. Very little expectoration is observed, or there may be none at all, but sputa, consisting of thick viscid mucus, streaked with blood in some cases, have been ejected.

Percussion yields the normal resonance, since the amount of lung tissue involved does not suffice to interfere with the resonance of the chest.

On *Auscultation*, when only a few inflammatory patches exist, no physical signs are present.

Crepitant rhonchus may occasionally be heard over portions of the lungs, together with harsh inspiration, bronchial breathing, and prolonged expiration. In some cases the physical signs of the co-existing bronchitis may entirely mask the catarrhal pneumonia. In rare cases a superficial patch of considerable size may be formed by the coalescence of numerous inflamed lobules, in which case over a circumscribed space the signs of solidification may be apparent.

Termination.—The duration of this form of pulmonary inflammation is subject to much variation: convalescence may sometimes follow in a few days, but frequently the affection lasts for a far longer period, and often tends to pass into a chronic state.

The *Prognosis* of catarrhal pneumonia is always grave, since it generally supervenes upon an attack of bronchitis, by which the child has been greatly exhausted; the indications of danger are extremely rapid breathing, high temperature, lividity of face, and symptoms of obstruction to the proper blood aëration. Even in cases of a less severe character, it must be borne in mind that lobular pneumonia very often passes into a chronic condition, and may induce chronic pulmonary phthisis by caseous degeneration of the epithelial cells congregated in the aveoli.

Causes.—The affection may result from cold and alternations of temperature. It is common in measles, whooping-cough, and affections of the larynx, and may occur in delicate children or in those who have been kept in a recumbent position by reason of some exhausting malady.

Pathology.—In catarrhal pneumonia there is a rapid multiplication of the alveolar epithelial cells by which the vesicles are speedily filled; some muco-serous secretion is mingled with the accumulated cells, but there is not the same free exudation into the air vesicles, and very little fibrillation is present, as in the lobar form.

Separate lobules are affected in catarrhal inflammation, and thus arise nodules which are scattered over and through the lungs, and these may vary in size from a hemp-seed to a pigeon's egg. They at first exhibit a red or reddish-grey appearance, and subsequently, in consequence of fatty changes in the cells, become of a grey or yellowish-grey colour.

When a case terminates favourably, the cells are either absorbed, or if serum be present in excess, may be discharged into the bronchioles and thrown off by expectoration. Perfect cure takes place by the alveolar walls returning to their original condition. If, on the other hand, the alterations in the alveolar walls are persistent, the alveolar

contents become the seat of caseous degeneration, and the chronic stage is established.

From careful post-mortem examination, the disease seems to result invariably from pulmonary collapse; a lobule having become emptied of air, and some of the contents of the bronchi having been forced by the inspiration into the alveoli, the lobule itself becomes the seat of active congestion, then of hepatisation, and at last no air can be driven into the lobule.

Microscopically, in the early stages of solidification, the lung tissue itself is unaltered, but the alveoli are crammed with cells, fatty changes occasionally taking place in the epithelium. At later periods the collapsed and inflamed lobules have coalesced into larger masses, producing solidification of large areas of the lung, in which at length softening occurs, the centre of the lobule becoming diffluent and grey, and its liquid constituents puriform. In some cases, another process may take place in the obliterated lobule, cheesy matter being formed.

Treatment.—All lowering measures are here contra-indicated; carbonate of ammonia, ipecacuanha, and senega, may be advantageously exhibited.

If there is an accumulation of sputa in the bronchial tubes, a mild emetic, such as sulphate of zinc, will be serviceable. The diet should consist chiefly of lime-water and milk and chicken-broth, with a small quantity of brandy. Warm linseed-poultices should always be applied to the back and chest.

During convalescence, syrup of the phosphate or of the iodide of iron, and cod-liver oil, will be indicated.

Chronic, Interstitial, Cirrhotic, or Fibroid Pneumonia

Is a form of lung disease which may sometimes be confounded with chronic phthisis. It is an affection of the connective tissue between the lobules, and leads to hardening and solidification of the lung tissue. In this variety, the lymph, which is always exuded in plastic or lobar pneumonia, and is either absorbed or thrown off by expectoration, remains in the lung, and degenerates into fibrous tissue and caseous matter.

The lungs substance is dark-grey in colour, hard, and permeated by bands of fibres, often enveloping old masses of tubercle. The disease may creep along insidiously and obstinately in delicate, ricketty children, lasting for a considerable time, and may follow lobar pneumonia, bronchitis, laryngeal catarrh, scarlatina, measles, or whooping-cough. It is sometimes apparently produced by disease of the bronchial and tracheal glands, which after death have been found caseous throughout their whole extent. The treatment must be conducted upon general principles.

Pulmonary Œdema

Consists of an infiltration of the lung with watery fluid; it is of rare occurrence in children.

Causes.—There is usually some obstruction to the free circulation of the blood, such as takes place in valvular diseases of the heart and in pneumonia. It may also result from anasarca after scarlatina.

It has been stated that pulmonary œdema may occur *idiopathically*, and produce those attacks of suffocative

orthopnœa by which children are sometimes destroyed after measles.

The affection is intimately associated with weakness and relaxation of the tissues and vessels. The blood is thinner and more watery than in health; there is a diminution in the quantity of the corpuscles and the organic materials, the serous portions thus transuding through the capillaries.

Symptoms.—The *Rational Signs* are obscure; the affection may be preceded by slight catarrh, but the respiration becomes extremely rapid, the pulmonary indications being wholly inadequate to account for such rapidity.

The *Physical Signs* are not very marked.

On *Percussion* there may be slight dulness.

On *Auscultation* the respiration is feeble, and frequently sub-crepitant, or fine bubbling rhonchus may be heard.

Pathology.—In consequence of the infiltration of watery fluid, the lung becomes inelastic and firm, it scarcely crepitates on pressure, contains but little air, and sinks in water.

On post-mortem examination clear serum may be found in the pleural cavity, or a thin layer of lymph may be present, indicating the previous occurrence of some amount of inflammatory action. The lungs are deep-red in colour, and on section there is an exudation of reddish serum, at the escape of which the lung tissue becomes less red and more crepitant on pressure.

Treatment.—This depends upon the causation. If occurring in *strumous* children, or those of unhealthy constitution, supporting measures are indicated, such as ammonia, brandy, wine, and good nutriment; if resulting from the anasarca of scarlet fever, the warm bath and diaphoretics must be employed.

In some cases small doses of antimony may be carefully administered, and poultices may be applied to the chest if much dyspnœa is present.

CHAPTER XVI.

Atelectasis Pulmonum,

Or imperfect expansion of the lungs, may be divided into two varieties :

(1) *Congenital Atelectasis.*
(2) *Post-Natal Atelectasis*, or *Pulmonary Collapse.*

The first form is only found in infants, certain portions of the lungs remaining in the fœtal state, never having been inflated by air. The second form is met with at all periods of life, but especially in young children, and results from the collapse of certain parts of the once expanded lung, *i.e.*, by these parts returning to their fœtal condition.

This latter form has been frequently described as carnification, or lobular pneumonia.

Congenital Atelectasis.—Symptoms.—These vary considerably in different cases. The infant is weak, and its cry, instead of being vigorous and loud, is low and wailing, the colour of its body is pale and leaden, the limbs are motionless and relaxed, the breathing is short and imperfect, the thorax imperfectly dilated. When these indications are very marked, the child may rapidly die asphyxiated, or, the respiration improving by degrees, it may be out of danger or pass into the same condition as one in whom from the first the symptoms have been less serious. There is a constant and characteristic plaintive moan with each respiration. The temperature of the lower extremities is lower than normal, the infant sucks very feebly, and sleeps most of its time. In favourable cases the symptoms gradually improve, the colour of the body becoming more natural, the cry louder and stronger, and the sucking more energetic.

In unfavourable cases the dangerous symptoms increase, there is great difficulty in swallowing, and spasmodic twitchings appear in the muscles of the face, the patient either

dying convulsed, or sinking into a quasi-condition of syncope.

An important sign is an alteration of the ribs during respiration.

In an ordinary healthy inspiration the ribs move outwards, thus expanding the transverse diameter of the thorax; but when the lungs expand imperfectly the ribs move inwards towards the mesian line of the trunk, the transverse thoracic diameter becoming diminished; the thoracic parietes are driven inwards by the external atmospheric pressure, since a vacuum is produced when the lung is inexpansive and collapsed.

When pulmonary collapse occurs in the early weeks of life in infants who at birth have shown no indications of such a condition, the symptoms are in reality those of cyanosis, and are far more serious than those of lung-collapse at later periods, the disturbance to the circulation being caused by the obstruction to the blood-flow from the right heart.

The *Prognosis* chiefly depends upon the physical condition of the child, and the causative agency; the greatest danger being in those cases which continue feeble, despite the most careful treatment.

Causes.—These are obscure, but may be the following: Original weakness of the infant, due to feeble health of the mother, or to multiple pregnancy; acquired debility, due to exposure to cold, vitiated air, or improper clothing, the act of respiration being prevented from its proper performance; obstruction of the air passages by fluid or mucus, in consequence of rupture of the umbilical cord during labour, and the head of the infant coming in contact with the maternal secretions. It may, in some cases, result from defective nerve energy, dependent upon pressure on the medulla oblongata, the roots of the pneumogastric nerves being implicated, in consequence of effusion of blood or

inflammatory exudations, occasioned by injuries during delivery.

Pathology.—In this variety the middle lobe and the lower edge of the upper lobes, the posterior portion and lower edge of the inferior lobes of the right lung are the parts most often affected. These portions are dark red or purple in colour, their size is diminished, and they are thus depressed below the level of the healthy portions, and are exactly similar in appearance, in all respects, to the fœtal lung. When artificially inflated, the appearance of the healthy lung is presented. In the majority of cases, the ductus arteriosus and foramen ovale are found unclosed.

Post-Natal Atelectasis or *Pulmonary Collapse.*—This term implies a return of the lung, after having been previously expanded, to the unexpanded, or fœtal condition.

This variety occurs under two forms:

(1) The *Lobular* or *Limited.*
(2) The *Diffused.*

In the *Lobular* form, simple lobules, or groups of lobules, become collapsed in different portions of a lobe or lung, the affected part assuming the character of irregular hard patches, either scattered through the interior of the lung tissue or situated upon its surface.

In the *Diffused* form, numerous contiguous lobules collapse, larger or smaller portions of the lung presenting a dense and solid appearance. Here the character of the affected portions somewhat resembles that of plastic pneumonia, and the condition has received the name of carnification, or splenisation.

To the distinct dense parts of the lobular variety the term "lobular pneumonia" has been applied.

The colour of a collapsed lung is dark violet or even black. The tissue is more or less hardened, but it is to a

certain extent supple and flaccid; on section the surface is uniform and smooth, without granulations; upon pressure, semi-transparent bloody serum exudes. The vessels, bronchi, and cellular structure, can be clearly recognised. Upon artificial inflation, the healthy characters of the lung gradually reappear.

Symptoms.—Pulmonary collapse is very frequently associated with bronchitis, and thus the symptoms indicating its presence will be mingled with those of the latter affection. The indications of uncomplicated collapse of the lung are, very rapid and embarrassed breathing, with very slight cough; on *Percussion*, more or less extensive dulness over various parts of the chest (usually over the inferior dorsal region); and on *Auscultation*, feeble or suppressed respiratory murmur, but very frequently imperfect and distant bronchial respiration, which is more audible in expiration than in inspiration. When very little bronchitis is present, these symptoms may continue for many weeks and even months, with more or less regularity, with regard to their extent and situation; the low condition of health and general weakness, however, are very marked and persistent.

Causes.—The two principal causes are the following: (*a*) some condition of the bronchi by which the passage of the air in inspiration is prevented, such as the presence of secretions in the air-tubes, or a plug of mucus; and (*b*) deficient power in the muscular apparatus to carry on properly the respiratory function, as is seen in delicate children, and may result from whooping-cough, measles, or diarrhœa.

Treatment.—The cause must be removed if possible, such as any accumulated mucus in the child's mouth. Measures calculated to stimulate respiration must be adopted, viz., frictions to the surface, plunging the body alternately into cool and warm water, and attempts at inflation of the lungs

may be made by mouth-to-mouth inspiration. When dependent upon simple debility, the child should be warmly clad and placed in a room at a temperature of 70° or 75° Fah. Plenty of good breast-milk should be given, if this is obtainable; mild stimulants, as weak brandy and water, or a few drops of the aromatic spirit of ammonia, may be exhibited. When the affection has continued for several weeks or months, the indications will be wine, brandy, and quinine in $\frac{1}{4}$ or $\frac{1}{2}$ grain doses, combined with the syrup of the iodide of iron.

In some cases of post-natal atelectasis liniments or plasters may be applied to the chest, ipecacuanha or alum may be serviceable, withdrawing these drugs if they should produce exhaustion, in which case carbonate of ammonia and senega will be more suitable remedies.

Pertussis,

Or *Whooping Cough*, may be defined as a spasmodic affection, both infectious and contagious, accompanied by a characteristic "whoop," terminating in vomiting. It has been divided into three *Stages:*

1. The *Catarrhal Stage*, or *Stage of Invasion;*
2. The *Spasmodic Stage*, or *Stage of Increase;* and
3. The *Terminal Stage*, or *Stage of Decline*, in which there is an amendment of all the symptoms.

The *Catarrhal Stage* usually presents the ordinary signs of simple catarrh, such as running at the eyes and nose, sneezing, and dry cough; but this last symptom has no special character.

There are, however, generally, more languor, irritability, and drowsiness than in an ordinary case of catarrh. The duration of this stage is very variable; its probable average

is about a fortnight, but it may continue for a much longer period.

In some few cases the characteristic features of the disease are exhibited from the first, the catarrhal stage being wanting.

In the *Spasmodic Stage*, the peculiar paroxysmal and convulsive nature of the affection is established. There are violent paroxysms of coughing, which recur after variable intervals. Immediately before the attack the child is irritable and anxious, or very quiet, and at its commencement will frequently seize any fixed object by which it may support itself. The character of the cough is spasmodic, sonorous, and dry, and consists of numerous successive, rapid, and short expirations, the thorax being apparently emptied of the whole of its contained air by the violence of the expulsive efforts. One or two deep, long, inspirations will succeed, being accompanied by the peculiar characteristic whoop, which is occasioned by the rapid and forcible drawing of the air through the spasmodically contracted glottis.

During the paroxysms, the face may become swollen and purple, and considerable exhaustion nearly always results. Almost invariably, a ropy, colourless fluid, accompanied by vomiting, follows the fit of coughing.

In cases of extreme severity, hæmorrhages are not unfrequent from many situations, such as the ears, nose, mouth, and from the conjunctivæ.

The average duration of a paroxysm is from a quarter to three-quarters of a minute, but it may last for two minutes or even longer. It has been known, in one instance, to continue for fifty-five minutes.

The duration of this stage is about 30 to 40 days.

The *Terminal Stage* is said to commence when the affection is evidently on the decline, general improvement taking place. Its duration is uncertain.

The *Symptoms* of pertussis may be summarised as follows:

There is usually a febrile stage of eight, ten, or twenty days' duration, sometimes accompanied, but generally followed, by violent paroxysms of coughing, with abundant sputa. The expiratory efforts are so powerful that the patient appears on the verge of suffocation until a long inspiratory act follows, the rush of air through the contracted glottis giving rise to the peculiar and characteristic "whoop," the signal of the child's safety. As soon as the fit is over, the child is to all appearance well, and returns to his play. There may be two or three paroxysms a day, or as many in an hour, and even when the attack ends in vomiting, there is craving for food.

Complications.—Whooping-cough may co-exist with or follow measles, small-pox, bronchitis, pneumonia, disordered bowels, or some cerebral affection, and it may lead to emphysema and collapse of the pulmonary tissue.

Causes.—Whooping-cough generally occurs in children, and has been observed in the first weeks of life; adults, however, are not exempt, and persons of seventy and eighty years of age have been known to suffer from the affection.

It is said by Todd to be due to a specific poison acting upon the eighth pair of nerves.

It is propagated by direct contagion, and often appears in the form of an epidemic, attacking many children simultaneously.

The *Prognosis* depends upon the complications, since simple pertussis is rarely a fatal disease. The most dangerous complication is convulsions, next in order is bronchitis, and lastly, pneumonia.

Pathology.—The only anatomical appearance is slight inflammation of the mucous membrane of the bronchial tubes, which are reddened, and thicker than in the normal state, and are filled with frothy mucus or thick viscid fluid.

Treatment.—This cannot be considered satisfactory.

Innumerable remedies have been employed, amongst them the following : *Sedatives*, tincture or extract of hyoscyamus, or conium, syrup of poppies, extract of lettuce, or prussic acid, belladonna, and digitalis; *Antispasmodics*, as musk, assafœtida, and camphor, oil of amber; *Alteratives*, as arsenic, alum, sulphate of zinc, and bromide of potassium. With respect to the majority of these remedies it has not inaptly been said, "Perhaps there is no disease for which so many *specifics* and infallible nostrums are promulgated with confidence, or so few actual remedies known."

It may, however, be stated in general terms that in uncomplicated cases of whooping-cough it will be useful to administer in the first place some mild alteratives and antacids, as hydrargyrum cum cretâ, soda, potash, and rhubarb, together with ipecacuanha in moderate and long-continued doses (5 to 10 minims, according to the age). In general, the disease lasts, in spite of all remedies, from a month to six weeks; but it may last much longer, in which case change of air will be found the most efficacious remedy, and not merely from an unhealthy to a healthy locality, but even *vice versâ*. It has been proposed, and successfully carried out, to take sufferers from whooping-cough to the neighbourhood of gas works, the effluvia from which appear to exercise a beneficial influence over the disease. When pertussis is complicated, as it often is, with other affections, the appropriate remedies must be employed. Thus, in the strumous diathesis, cod-liver oil and iron preparations will be indicated.

CHAPTER XVII.

GENERAL DISEASES.

Tuberculosis.

In children this affection presents special symptoms and possesses peculiar characters.

Causes.—Hereditary tendency, early weaning, bad quality of the nurse's milk, and improper artificial food subsequent to weaning, exercise a powerful influence in producing tuberculosis, and it has been sometimes traced to frequent attacks of diarrhœa and indigestion. Tuberculosis tends to develop itself after such affections as typhoid fever, whooping-cough, measles, and occasionally small-pox. When pneumonia coexists with tuberculosis, the inflammation is by some considered to be a secondary affection occasioned by the tubercular deposition in the lung; others, however, are of opinion that when predisposition exists the pneumonia itself induces the development of the tuberculous matter in the lung.

The influence of foci of caseous degeneration in the production of general tuberculosis is now universally recognised, and in children the usual seat of these foci is in connexion with the lymphatic glands, but they also occur in connexion with chronic ulcers, and disease of the bones.

Tubercular deposits in children are most frequently found in the bronchial glands, the lungs, the peritoneum, and mesenteric glands, and in the brain. A special characteristic, however, of tuberculosis in the young is its tendency to implicate several viscera at the same time, the lungs in many cases not being involved.

Pathology.—In *Bronchial Phthisis*, which may occasionally exist as a separate affection, although in general it is an

accompaniment of pulmonary phthisis, the glands inclose tuberculous matter, and are much enlarged. The glands chiefly involved are those lying along the trachea, and surrounding its bifurcation; the deposit generally exists as infiltrated tubercle, and does not, as a rule, soften; calcification and obsolescence are constant terminations of bronchial tubercle. Many of the tuberculous glands are enveloped by a dense capsule, which owes its origin to the normal cellular investment of the gland becoming hypertrophied.

In the *Pulmonary Phthisis* of children certain peculiarities are presented: Thus, grey granulations and crude yellow tubercles often exist in the lungs, independently of other forms of tuberculous deposits, and of each other; the so-called yellow infiltrated tubercle is also observed with great frequency in early life.

A notable peculiarity in children, also, is the rare occurrence of cavities in the lung. Occasionally cavities resembling the vomicæ of the adult have been observed; these appearing more frequently beyond the age of six. In some instances a cavity may be caused by very small tuberculous products becoming softened and forming little cavities, which subsequently coalesce.

A third form of tuberculous cavity is occasioned by the softening of considerable portions of lung which are the seat of yellow infiltration, an entire pulmonary lobe being converted into a sac, with thin walls.

In the *Peritoneum*, tubercular deposit seldom takes place independently of similar disease elsewhere.

Tabes mesenterica, or tuberculisation of the mesenteric glands, has been described in earlier pages.

The *Symptoms* of *Bronchial Phthisis* are similar to those of pulmonary phthisis; but, in addition, the most notable are those resulting from the mechanical effect upon the neighbouring tissues of the hardened and enlarged glands.

This variety of phthisis occurs in its most definite form between two and six years of age. The cough in the early stage is hacking and slight, but it speedily becomes severe, and intermittent. The respiration becomes embarrassed, and is accompanied by a prolonged wheezing sound. The superficial thoracic veins become enlarged; epistaxis may result from the return of the blood from the superior vena cava being obstructed; hæmoptysis and pulmonary œdema may be occasionally set up by compression of the lung tissue. The œsophagus may be so compressed as to give rise to dysphagia.

Physical Signs.—In consequence of the solidity of the enlarged and tuberculous bronchial glands, and the ease with which they are made to vibrate, many breath-sounds are directly transmitted to the ear and apparently exaggerated. The sounds on percussion and auscultation are best heard at the apex of the lungs posteriorly, or at the level of those vertebræ with which the affected glands are in contact.

Percussion.—In a healthy young child, in consequence of the remains of the thymus gland, the resonance over the manubrium of the sternum is diminished, but in some marked cases of bronchial phthisis the dulness extends laterally and downwards, since the enlarged glands project into the anterior mediastinum; but, since the affected glands are more often in contact with the spinal column, dull percussion is nearly always found in the interscapular space.

On *Auscultation*, tubular breathing is frequently observed over the superior part of the sternum, reaching nearly to the base of the heart. A venous hum is often caused by the superior vena cava being compressed by the enlarged glands; or, a systolic murmur, loudest at the second left interspace, may be present, due to a compressed pulmonary artery. A striking peculiarity of this variety is the constant and great

fluctuation in the condition of the patient; when the child seems at its worst, a sudden remission in the symptoms will take place, inspiring false hopes; for, after a variable respite, all the severe symptoms return. In some rare cases, however, the most serious indications have by degrees disappeared, and fair health has been established. Under these circumstances, the deposit of tubercle has, probably, become the seat of calcareous degeneration, or has been expectorated after having softened and opened into a bronchus.

The following is a summary of the essential features of bronchial phthisis:—The symptoms are frequently developed from one or more attacks of bronchitis; the attendant cough is of a peculiar paroxysmal nature, and similar to that of an incipient attack of whooping-cough: the fluctuations in the patient's condition are great and frequent; and the aggravation of the cough and shortness of breath which occasionally occur, without apparent cause, are very characteristic.

Pulmonary Phthisis.—Pulmonary Consumption.—The general symptoms of this affection are of peculiar importance in children, in consequence of the absence of, or the great difficulty in the determination of, numerous symptoms which are of great assistance in the recognition of the same disease in the adult.

In cases of inherited tuberculosis the phthisical characteristics are the strongest, viz., the slim, tall frame, the delicate, pellucid complexion, the firm bones, with their small, yielding cartilages, the fine and silken hair, the frequently precocious intellect, and the special susceptibility to catching cold. Careful attention to these points in the pulmonary tuberculosis of children may often afford more important information than the investigation of the physical signs.

Many of the *Rational Signs* in children are identical with those of the adult, but special attention must be directed to the differences which occur in the following:

The *Cough* is subject to much variation, according to the amount of irritation in the bronchi. It is sometimes very slight, at other times so violent, and associated with dyspnœa of such severity, from accompanying bronchitis, as to threaten instant death.

It is remarkable that in the consumption of children expectoration is absolutely wanting, the secretions being either retained in the bronchial tubes, or, if reaching the pharynx, being swallowed without any expulsive effort.

Hæmoptysis is very rare in children; when it does occur and causes death, it is owing to the complication of bronchial phthisis rather than to a bloodvessel being ruptured in a cavity.

The *Pulse* is invariably quickened, and becomes very rapid with the rise in the temperature.

The *Temperature* is usually higher than the normal, but it constantly fluctuates, both on different days, and at different hours on the same day. It may at times be normal, and at others rise to 102° Fah., or even higher. The highest temperature is, as a rule, observed at night, and is generally accompanied by flushing of the cheeks.

The colliquative and exhaustive night-sweats of adults are rarely seen in children.

The *Appetite* is very capricious, the digestion is impaired, and the tongue furred. The bowels may either be constipated or diarrhœa may be present, the motions being clay-coloured and offensive. The child, of course, becomes weak and emaciated, its skin becomes wrinkled, and the face old-looking. In many cases the child only presents the symptoms of deficient nutrition, such as languor, loss of appetite, of flesh, and of strength, for some time before the indications of lung disease are heralded by the development of cough.

Physical Signs.—Usually the deposition of tuberculous

material in children is more uniform and generally diffused over the lung than in adults, in whom the apices of the lungs are in general chiefly affected, and therefore the advantages derivable by comparing the results of percussion and auscultation of one part with those of another are to a great extent lost.

Those signs which are developed at a single point in the adult are also wanting, viz. : the coarse or harsh breathing, which is of so much value in the recognition of the very early stages of tuberculous deposit in the apices of the lung. Again, the enlarged and tuberculous bronchial glands, which so frequently are associated with the phthisis of children, transmit many breath-sounds with exaggerated intensity. Thus, jerky or wavy inspiration, and prolonged expiration beneath the clavicles, such valuable indications in the early phthisis of adults, lose much of their importance in that of children. Again, care must be taken not to confound with a large tuberculous cavity, the blowing sound, mingled with moist rhonchi, which may be transmitted from a compressed bronchus filled with mucus.

In early life the results of percussion are considerably vitiated by the excessive resonance of the thorax, the recognition of fine variations of sonority being thus obviated.

The information derivable in older persons from the vocal resonance and its alteration is difficult to obtain in children, although from the resonance and fremitus of the cry or cough, it may be sometimes possible to draw reliable conclusions.

To summarise briefly the signs of pulmonary phthisis in children : On percussion, there may be general though slight dulness ; on inspection, some flattening may be apparent under the clavicles ; on auscultation, the breathing may be interrupted and the expiration prolonged.

When the tuberculous deposition commences the breath-

sounds may be weak or bronchial, a click being heard at the end of the inspiratory act; whilst at a later period various moist sounds may be heard, such as sibilant, mucous, or subcrepitant rhonchi; and still later, if cavities form (not a common event), cavernous or amphoric respiration, pectoriloquy, or mucous gurgling may be recognised.

Strong evidence of tuberculous deposition is exhibited if harsh breathing exists for many weeks, being followed by weak or jerky, wavy respiration, or a variety of inspiration terminating with a click.

In acute cases death may occur in a few weeks or even days by acute development of tubercle, under which circumstances it will probably be found that tuberculous deposit, or inflammatory caseous exudation, has previously existed in some part of the economy, although its extent has been insufficient to interfere with nutrition, or to attract attention.

In chronic cases of phthisis the symptoms may last for some years; in a favourable case, occasionally, some transient improvement in the general symptoms may take place, in rare instances health being slowly regained, and the physical signs diminishing by degrees, some dulness and weak respiration remaining at those points in which absolute indications of advanced lung disease existed previously.

Terminations.—Death usually results from exhaustion and impaired nutrition; but, occasionally, in bronchial phthisis, a fatal issue has followed copious hæmorrhage, due to perforation of a pulmonary blood-vessel. An intercurrent attack of pneumonia, bronchitis, or peritonitis, is often the immediate cause of death, and, in other instances, death may be preceded by cerebral symptoms, indicating the deposit of tubercle in the brain-meninges.

Treatment comprises *Prophylactic* and *Curative* measures. The former of these measures is very important with reference to the children of tuberculous parents, or those who

have shown early indications of delicate health. The infant should be kept to the breast to the age of fifteen, or even eighteen, months (a practice to be avoided with healthy children); but, if the mother herself be tuberculous, a healthy wet-nurse should be substituted.

As age advances, great attention should be paid to the clothing and food, exercise in the open air and perfect ventilation of the sleeping-room being imperative. If possible, the child should lead a country life for several months in the year in a bracing atmosphere.

As regards the *Curative* treatment, the same remedies are indicated as in adults.

Cod-liver oil is first in importance; if this remedy disagrees, cream or glycerine may be given. Syrup of the phosphate or the iodide of iron is very serviceable. With failing appetite and debility, bark and quinine are very useful.

If night-sweats are frequent, the mineral acids, oxide of zinc, hyoscyamus, and gallic acid, may be resorted to. Small doses of belladonna, morphia, and diluted hydrocyanic acid, may be given to allay cough. A good result may sometimes be obtained by painting under the clavicles and other parts of the chest with iodine.

Salt-water bathing often confers benefit, and rubbing the body with cod-liver oil is often useful, when the internal administration of this substance is impossible.

Other internal remedies are nux vomica, and the hypophosphites of lime, iron, and soda. The diet, of course, must be regulated with extreme care, bland, digestible, and non-irritating food being chosen. Any diarrhœa or gastric disturbances that may arise must be sedulously checked, and abdominal pain may be allayed by warm anodyne poultices, by sinapisms, or by gentle rubbing with a sedative embrocation.

Scrofulosis, Scrofula, Struma.

The term scrofula implies a peculiar constitutional state in which an irritable condition of the lymphatics is present, which condition renders them prone to becoming enlarged from trivial causes, and simultaneously indisposed to take on action of a healthy and reparative character, and which is also liable to manifest itself by various chronic and obstinate affections of the mucous or synovial membranes, and of the skin and bones.

Scrofula is intimately associated with tuberculosis, but these two cachexiæ cannot be considered identical, since many points of difference exist between them. Scrofula is far more a disease of early life than is tuberculosis. The latter disease chiefly affects the serous membranes, the lungs, the solid abdominal viscera, the respiratory and alimentary organs, whereas scrofula shows a preference for the bones, the skin, and the adjacent mucous membrane.

Patients who have suffered from chronic scrofulous affections frequently become the subjects of tuberculosis, and the offspring of tuberculous parents are often scrofulous.

Causes.—Scrofula is very frequently due to hereditary predisposition. Although the actual disease may not be transmitted from parent to child, yet the tendency to develop it is often so powerful that the greatest care and the most favourable hygienic influences are powerless to overcome it.

Scrofula may be met with in a feeble, vitiated constitution, which has been inherited from parents who have been the subjects of tuberculosis or of constitutional syphilis, but it is often acquired soon after birth, manifesting itself in the offspring of parents of sound constitution.

The causes tending to develop scrofula are:—Improper and insufficient food, long-continued exposure to cold and

damp, and to a vitiated atmosphere, and certain diseases, such as enteric fever, measles, and chronic malaria.

Symptoms.—The scrofulous diathesis may be indicated by lethargy and heaviness of mind, phlegmatic temperament, opaque, thick, and muddy-looking skin. The features, especially the nose and lips, may be coarse, and the lymphatic glands may be clearly perceptible. The belly is large and full; the bones large and their extremities coarse and thick.

There are no absolute pathognomonic characters of scrofula; the apparent manifestations may all appear as mere idiopathic affections, produced by some definite cause in a child of sound constitution. The characteristics of these affections in the so-called scrofulous garb are the trifling causes by which they are excited, their inveterate and obstinate persistency, and their connexion in the same subject with other analogous phenomena. The majority of these manifestations exhibit themselves as chronic inflammations of the affected part. The inflammation may at times apparently arise spontaneously; but, usually, some trifling exciting cause can be traced; enlarged scrofulous glands are liable to be preceded by irritation of the area of the lymphatics which pass to the affected glands; thus, eruptions on the scalp or behind the ears, or attacks of sore throat, are often succeeded by enlarged lymphatics of the neck.

The most frequent of the so-called scrofulous or strumous affections are the following, viz.:—enlargement of the superficial lymphatic glands; skin eruptions, especially the pustular and vesicular varieties; ecthyma, impetigo, and eczema are particularly common (papular and neurotic affections are more common in the tubercular diathesis); cutaneous abscesses of a very *indolent* character, increasing slowly, not tender, and often leaving permanent scars. It is a common statement of a mother that the glands of her child's ears are

down; and an entire chain of glands may often be found encircling the neck like a string of beads; one or more of the glands may be slowly suppurating, sinuses being eventually formed, leaving the unsightly marks so commonly observed in strumous subjects. Other scrofulous indications are:—chronic affections of the mucous membranes continuous with the external skin, such as the conjunctiva, the Schneiderian membrane, the membrane of the vagina or vulva, and that of the meatus auditorius externus; chronic ostitis with caries and chronic effusions in the synovial membranes. The severe and advanced forms of scrofula may lead to the development of lesions of the different internal viscera, the most conspicuous being caseous pneumonia and bronchitis, and amyloid degeneration of the liver, kidneys, and spleen. Pneumonia and bronchitis may sometimes occur under aspects which may be considered scrofulous from their very commencement, but in other cases they appear to arise as acute inflammatory affections, which through the influence of the strong scrofulous taint degenerate into a chronic form, being characterised by the low type of the morbid products evolved, by the obstinate and intractable course pursued by the affections, and by the strong tendency to the occurrence of destructive changes and caseous degeneration in the affected parts.

To summarise briefly, the existence of scrofula may be determined by the general signs of a scrofulous diathesis, the existence of an hereditary tendency, the order of evolution and spontaneity of the phenomena, and lastly by the obstinate resistance to ordinary remedial measures.

The *Prognosis* depends for the most part upon the intensity of the scrofulous diathesis, the severity of the local indications, and the surroundings of the child. Complete restoration to health may result, even in cases which threaten to prove tedious and obstinate, if the constitution is fairly

good, and the existing scrofulous lesions are merely superficial, but scrofulous disease in some other shape is in all cases liable to recur, and visceral lesions of great gravity may be developed. When considerable disease of the glandular and bony structures is present, the prognosis is extremely unfavourable.

Treatment.—This must comprise proper hygienic and constitutional remedies. Preventive measures are of extreme importance, the strictest attention being paid to hygienic measures. For the child of a scrofulous or tuberculous parent, a wet nurse should be obtained, if the mother is not capable of suckling it. No artificial food should be employed. After weaning, the diet should be very digestible and nutritious. The greatest protection against catarrhal affections should be ensured. The child, if possible, should reside at the sea-side for several months in the year. Sea-bathing is highly beneficial, and when this cannot be obtained bay-salt or rock-salt baths must be given. Cod-liver oil, with iron, lime, and iodine preparations must never be omitted, iodide of potassium and iodide of iron may be advantageously combined, and other iron preparations, associated with quinia or some vegetable bitter, are often valuable. Arsenic is often of great service in the treatment of scrofula, and this remedy may either be given alone, or combined with quinia and iron. Iodide of lead ointment is often of great service in discussing the scrofulous enlargements, and it should be rubbed into them two or three times a day.

CHAPTER XVIII.

Rachitis.—Rickets.

This is a constitutional affection peculiar to infancy and childhood, characterised by impairment of nutrition, and by alterations in the composition and shape of the bones.

Causes.—Rickets may occur in the fœtus before birth. It is probably most frequent from the second or third month to the end of the second year.

It is stated that it never appears after the termination of the first dentition in a child previously quite healthy. It is questionable whether the disease is hereditary or not, but undoubtedly the health of the parents exercises a great influence in developing rickets. Any cause which induces anæmia and debility in the mother, such as protracted lactation or too frequent pregnancies, may lead to rickets in the last born children. Premature weaning, or suckling continued for a long time after the proper period for weaning, and after the quality of the mother's milk has deteriorated, or the substitution of improper food for the milk of the mother, may predispose to rickets. The use of poor and innutritious food at any period of early childhood may also influence its development. Any causes which impair nutrition and assimilation—impure water, bad ventilation, and dirty dwellings, may be considered causes of this disease. The alterations and deformities of the bones are not developed until the cachectic condition of the system has lasted for some time, which may vary from a few weeks to many months.

Rickets may be divided into *Two Stages:*

The *Initiatory Stage*, and
The *Stage of Deformity.*

Symptoms.—The early symptoms, or those of the initiatory stage, are connected with digestion. The appetite may be capricious and the bowels irregular. There is generally diarrhœa; the stools are greenish and mucous, becoming subsequently serous, watery, of a slate colour, and extremely fœtid. The child frequently becomes much emaciated. The head is frequently covered with sweat, which occurs after any exertion, and especially during sleep. Heat and dryness of the trunk and extremities are often present, and the child frequently throws the bed-clothes off at night. In some cases general soreness and tenderness of the body, with pain on movement, are occasionally present.

When rickets appears before the first dentition is completed, the development of the teeth is invariably delayed; they are cut late, and they either fall very early from their sockets or they decay. In some cases the amount of the urine is increased, and the phosphates are in excess, and in other cases an acid, said to be lactic acid, is stated to be present.

Some authors state that the intellect is deficient in power and capacity, whilst other maintain that it is often precocious.

Later in the disease, a strange, sedate appearance of the countenance is observed, giving a peculiar expression of age when combined with the unusually square and broad face.

The Stage of Deformity.—After the above symptoms have continued for a variable period there appear bead-like swellings at the junction line of the ribs and the costal cartilages, and also at the shafts and epiphyses of the extremities, imparting to these situations and to the wrists and ankles a peculiar double-jointed knobby aspect.

Simultaneously with the above appearances, the bones become so softened that they bend with pressure. Early in this stage "*soft spots*" in the occipital bones (craniotabes)

appear, and these are sometimes the first bone-lesions recognisable.

As soon as the child begins to walk, one or both femora may bend, so that they become distinctly convex forwards. The tibiæ may also bend in the same direction, and these bones, also bending inwards, may produce in the legs a series of curvatures.

Forward curvature of the femora may, however, be produced even before the child has begun to walk merely by the weight of the feet and legs hanging from the knee joints, whilst the child sits on a chair or on the lap of the mother. The bones of the upper limbs also partake in the deformities; the humeri, from the weight of the arms when raised by the action of the deltoid muscles, bend at the insertion of these muscles, and the pressure made with the open palms when the child helps itself to sit up may cause bending of the fore-arm bones and the humeri. Double curvature of the clavicles is often observed—one curve being backwards and situated about half an inch from the acromio-clavicular joint, the other being forwards and somewhat upwards, and situated just external to the attachment to the sterno-cleido-mastoideus. The most important deformities are those affecting the head, thorax, spine, and pelvis. According to Jenner, the peculiarities presented by the head are the following:

1. The length of time the anterior fontanelle remains open. In the healthy child it closes completely before the expiration of the second year. In the ricketty child it is often widely open at that period.

2. Thickening of the bones. This is usually most perceptible just outside the sutures, the situation of the sutures being indicated by deep furrows.

3. The relative length of the antero-posterior diameter of the head.

4. The height, squareness, and projection of the forehead.

The first two of these peculiarities of the ricketty head are the result of the affection of the bones; the last two are due chiefly to disease of the cerebrum.

The spinal curvature varies according to whether the child is unable or able to walk. In the former case the curvature is posterior, commencing at the first dorsal, and spreading to the last lumbar vertebræ; in the latter case, the posterior curvature is confined to the dorsal region, but is associated with anterior curvature in the lumbar region. In consequence of the anterior cervical curvature, the face is directed upwards, the head falls backwards, swaying loosely from side to side since through the weakness of the muscles it is unsupported.

The deformities of the thorax occasion serious embarrassment to the action of the lungs and heart.

In consequence of the spinal curvature, the ribs become flattened laterally, and project more horizontally, the lateral diameter of the chest becoming much diminished, the sternum being carried forward, and the antero-posterior diameter of the thorax being thus increased. A marked groove is also observed on either side of the sternum, extending from the first to the ninth or tenth ribs, along the junction line of the ribs with their cartilages.

The characteristics of the ricketty pelvis are: Shortening of the antero-posterior diameter, the upper strait becoming oval-shaped, or sometimes heart-shaped. In extreme cases the pelvis becomes triangular through approximation of its sides, but numerous conditions affect its form, such as the stage of ossification, and the direction in which the pelvis is compressed by the thigh bones from below and the spine from above. In ricketty children the belly is generally prominent, partly from weakness of the abdominal muscles, distension of the intestines by flatus, and the hepatic and

splenic enlargements so often present, and partly from diminished capacity of the thorax.

Terminations.—Catarrh and Bronchitis, the danger from these affections being much increased by the respiration being mechanically impeded through the deformity of the thorax; a specific and peculiar alteration of various organs, as the liver and spleen, which at one time was considered to be of an amyloid or albuminoid character; laryngismus stridulus; chronic hydrocephalus; convulsions; severe and persistent diarrhœa.

The *Duration* of rickets greatly varies. If the disease does not commence until late in the second or third year, and the child's surroundings are favourable, recovery generally takes place, although the affection may continue for many years; but, if the cachexia is marked, the disease appearing at an early age, and the hygienic surroundings are unfavourable, its course is frequently very rapid, and a fatal result ensues.

Pathology.—The long bones present marked swellings at the line of their junction with the epiphyses, due to extreme development of the spongy tissue at the end of the bone and the epiphysis, and to considerable proliferation of the cartilage of the epiphysis.

No deposit of granular calcareous particles takes place at the line of ossification, the cartilage-cells becoming calcified before ossification of the matrix, and becoming converted into bone cells.

The results of chemical analysis have established the theory that rickets essentially consists in deficiency of lime-salts from the bones.

The periosteum is generally thickened, and extremely vascular.

The bones become so soft that they may be bent in any direction, and even easily cut with a knife.

The diminution in the proportion of the lime-salts produces the softening of the bones. It is stated that the bones of ricketty children yield about seventy-nine parts of organic matters to twenty-one parts of inorganic matters, whereas the bones of healthy children yield about thirty-seven parts of organic and sixty-three of inorganic matters. Several authorities have also asserted that, in advanced rickets, the bones, on boiling, yield no chondrin or gelatine.

Certain lesions of the viscera are not unfrequently met with; such as the quasi-albuminoid changes previously mentioned.

From the peculiar deformity of the thorax, the anterior borders of the lungs become the seat of considerable emphysema, and the band of pulmonary tissue, which corresponds to the deep groove at the sternal end of the ribs, is compressed and collapsed.

Treatment. — The greatest attention must be paid to hygienic conditions, and to the feeding of the infant. A wet-nurse should be substituted if the mother's milk is deficient either in quantity or quality, or carefully selected cow's milk may be provided. The most nutritious and digestible diet must be given after the child is weaned, and especially a diet containing a large amount of animal food.

In ricketty children the teeth are generally defective, and as complete mastication is often impossible, their meat should be finely chopped and bruised in a mortar. The child should be taken out daily in the open air and in the sunlight; and it should be suitably and warmly clad.

Salt-water baths may be given with benefit.

Impaired digestion and diarrhœa may call for vegetable tonics, iron preparations, antacids, and mild astringents. Cod-liver oil should be always given, either alone, or in combination with vegetable tonics and iron preparations.

The cod-liver oil may be rubbed into the axillæ, or the groins, if the internal administration of this substance is attended with difficulty.

The oil may sometimes be better tolerated when given in the form of an emulsion, or when combined with lime water.

To prevent deformities, the child should lie upon a smooth, firm mattress; no high pillows should be allowed, and, until the bones have become inflexible and firm, no sitting-up for any length of time, or attempts at walking, should be permitted.

During the earlier stages of the disease mechanical contrivances are not advisable, but during convalescence attempts should be made, by means of pasteboard or leather-splints, to control the deformities.

CHAPTER XIX.

Syphilis.

Infantile syphilis differs in many points from the adult form.

A syphilitic father may beget an infected embryo by which the mother may be infected. Syphilitic children may be born of healthy women, and these children, although they have never had the disease in a primary form, may suffer from secondary symptoms. Direct infection through the mother is, of course, equally possible, and this is in all probability the usual manner in which syphilisation of the fœtus takes place.

In the constitutional form of the disease infection of the child is produced through the germinal fluid of the

father, or through the vitiated blood of either or both parents; but it presents many points of difference from that which may in rare cases be acquired by vaccination, or may be contracted from a syphilitic nurse.

Miscarriages are liable to occur in women who are the subjects of secondary syphilis.

The fœtus may often be destroyed by intra-uterine syphilis, or a living child may be born with indications of the affection, but, as a rule, constitutional symptoms are not exhibited until about a month or six weeks after birth, at which period a previously well nourished infant commences to "snuffle" (the snuffles) and becomes emaciated.

The snuffling is due to some low form of inflammation of the Schneiderian membrane. A dull red eruption in patches of considerable size is seen upon different parts of the body. The spots are sometimes bright and roseoloid, but in the majority of cases they are coppery in hue, condylomata and ragged ulcers may be seen spreading from the scrotum to the anus in the male, and large dry scaly patches of psoriasis upon the upper and outer parts of the thighs. When the taint is severe, the flexures of the joints are often the seat of fissures and psoriasis, and pemphigus and red mucous patches may be present. In the course of a few weeks the skin becomes deeply wrinkled, and the aspect of the child is that of a little old man. There is a peculiar hoarse cry, the eyelashes and eyebrows are frequently absent and the hair is scanty, the hands and feet are often affected by psoriasis; the pathognomonic sign, however, of congenital syphilis is the copper-coloured blush upon the nates and anus. This can only be found in the early months of infancy.

A valuable symptom is a peculiar variety of inflammation of the cornea, or interstitial keratitis. It is generally symmetrical, and is accompanied by opacity of both corneæ, due to formation of lymph in the substance of these

structures. The inflammation, as a rule, subsides in a few weeks or months, slight cloudy opacites remaining here and there in the corneæ.

This variety of corneal inflammation never appears in acquired syphilitis.

A peculiar alteration in the permanent incisor teeth is frequently present. The syphilitic teeth have been described in earlier pages.*

Death often occurs before the termination of the first year, either in consequence of the intensity of the anæmia and cachexia, or the development of visceral affections; or from the severe coryza, and the impossibility of nourishing the infant. When, however, the child does survive, the affection abates about the end of the first year; but it frequently, after being latent for some time, reappears in some tertiary form.

It is stated that the tertiary period may commence at any time after the fifth year, but it is usually delayed until near the period of puberty.

Visceral symptoms are rarely well marked in cases of congenital syphilis; but occasionally the liver and spleen are firm and enlarged, and in these cases ascites is usually present, and in some instances affections of the nervous system are observed, but generally limited to a single pair of cerebral nerves—as the optic, causing blindness, or the auditory, causing deafness.

Marked disease of the bones is even now rare, but nodes often form upon the long bones. In a few cases serious disease of the bony structures appears.

Pathology.—The liver and lungs are the chief seats of lesion in inherited syphilis, but more rarely the thymus gland and the brain exhibit indications of disease. The liver is rounded, hardened, and enlarged, apparently from

* See pp. 34, 35.

subacute hepatitis, or from infiltration of the organ with amyloid or albuminoid substance.

Gummy tumours in the liver are comparatively rare in children, but tumours of this nature are sometimes found in the lungs, which generally show cheesy degeneration in their centres; and occasionally a form of consolidation, which has been termed "white-hepatisation," dependent upon chronic catarrhal pneumonia with infarction of the air vesicles with epithelial cells in a condition of partial caseous degeneration, has been observed. Suppurative inflammation is sometimes found in the thymus gland, in the substance of which abscesses have been discovered.

The *Prognosis* is favourable if the father only has secondary symptoms which are mild, if the affection does not appear until the third or fourth week, if the general nutrition is not seriously injured, and if proper treatment can be at once obtained; but it is unfavourable when both parents are infected, when the disease appears soon after birth, and the emaciation is extreme and rapid.

Treatment.—If the mother has previously given birth to syphilitic children, it is advisable to subject her to a mild course of mercury during her subsequent pregnancies. For the infant the most nutritious diet must be afforded; no wet-nurse should be employed, in consequence of the risk of her becoming infected. During marked symptoms, some mercurial must be exhibited, such as hydrargyrum cum creta or calomel; or this alterative may be conveyed to the system by inunction of mercurial ointment. A flannel roller may be smeared with the ointment and bound round the child, by whose movements rapid absorption is occasioned.

Small doses of the mercurial should be used, and they should be steadily continued in order to affect the system; but this remedy should be stopped short of salivation, which

occurrence is, however, rare in children, and it should be discontinued temporarily, if any gastric symptoms arise. The mercurial may be followed by iodide of iron or iodide of potassium, either separately or together.

Liebig's extract of meat, and raw beef finely scraped, are often valuable in supporting the strength of the patient.

If any sores are present, they may be treated with black-wash, and, if condylomata are present, they may be touched from time to time with solid nitrate of silver, or dusted with calomel.

CHAPTER XX.

Atrophy or Marasmus.

By the term "atrophy" is implied a decrease in the size of a tissue, or of the whole body, resulting in impairment of function. During atrophy of adipose tissue, the fat cells, from gradual loss of their contents, diminish in size, and emaciation follows. Atrophy is not the same process as degeneration, which merely consists in deterioration of the quality (not necessarily of the quantity) of a tissue, but the latter condition is always sooner or later accompanied by the former.

Marasmus is very common in infants and young children; it originates in defective nutrition, and can scarcely be considered as an independent affection, but rather as a condition of lowered vitality and excessive debility.

Causes.—Any interference with the nutrition of an organ, such as unwholesome food or deficiency of food, is a cause of atrophy. More rapid and severe results ensue from

interference with the nutrition of an infant in whose growing tissues nutritive changes are far more energetic than in those which are mature. Emaciation may arise from compression or obliteration of the thoracic duct, the chyle being thus unable to reach the general circulation. It may also be caused by functional disturbance of the liver, such as obstruction of the passage of bile into the bowels, or some interference with or derangement of the glycogenetic function of the liver. Any cause producing considerable waste of nutritive matter will occasion atrophy, viz. : excessive diarrhœa and vomiting, protracted suppuration, and prolonged hæmorrhage. In infants and young children the circumstances which most frequently occasion atrophy are those which lead to defective nutrition, such as in some cases the sudden inability of the mother to suckle the child, insufficiency of breast milk in a hard-working delicate mother, or the administration of insufficient or indigestible food, and in many cases the evil practice of continuing to suckle the child up to sixteen months or even two years of age.

Previous to the seventh or eighth month the conversion of starch into glucose or grape sugar does not take place, so that in young children the exhibition of starchy products before the pancreatic and salivary glands have attained full development is a fertile cause of marasmus.

In an imperfectly fed infant, if death does not occur early, some inflammatory affection is induced, or some morbid deposition, such as tubercle, takes place in the various organs.

It occasionally happens that a young child, without any obvious reason, becomes suddenly irritable and fretful, losing strength and flesh, the heat of the body decreases, and the face becomes pale. The sleep is short and disturbed, and the stools become dark or green-coloured and

offensive ; if these symptoms are not rapidly counteracted, he gradually dies.

When atrophy becomes chronic, all trace of fat disappears from the face, the skin over the whole body becomes wrinkled and loose, and in consequence of the brain irritation contraction of many of the facial muscles ensues, the face acquiring a senile look.

Treatment.—If the mother's milk be insufficient, a wet nurse must be obtained or the child must be brought up by hand, due regard being paid to the age and digestive capabilities of the patient. Cod-liver oil is extremely serviceable, either alone or combined with lime-water. Glycerine may be substituted if the oil is rejected. Cod-liver oil inunction should also be employed. Steel wine should be given in some cases. Raw meat juice is highly recommended by some authorities.

In some cases all foods are rejected, and pass by the bowels in an undigested state. Here as little work as possible must be thrown upon the digestive organs. Artificially digested food must be administered, so that its mere absorption will be demanded. The food must be peptonised in order to carry out this object. Some of the most effective peptonised foods are Benger's Liquor Pancreaticus and Liquor Pepticus, Bullock's Acid Glycerine of Pepsine, and Savory and Moore's two Saline Essences of Pancreatine and Pepsine.

According to Dr. W. Roberts, milk and milk-gruel may be peptonised as follows :

Peptonised Milk.—Fresh milk is diluted with water in the proportion of three parts of milk to one part of water. A pint of this mixture is heated to boiling, and then poured into a covered jug. When it has cooled down to about 140° Fahr., three teaspoonfuls of the Liquor Pancreaticus, and about half a small teaspoonful of bicarbonate of soda

(in solution) are mixed with the fluid. The jug is then placed under a "cosey" in a warm situation for one hour. At the end of this time the product is again boiled for a couple of minutes. It can then be used like ordinary milk.

Peptonised Milk-Gruel.—Half-a-pint of well-boiled gruel is added, while still boiling-hot, to half-a-pint of cold milk in a covered jug. The mixture will have a temperature of about 125° Fahr. The Liquor Pancreaticus and the bicarbonate of soda are then added in the same proportions as in the preceding process. The jug is placed under a "cosey" and kept warm for an hour-and-a-half. The contents are then boiled for a couple of minutes, and the product is ready for use. By this second method the use of the thermometer is dispensed with.

It is sometimes necessary to feed the child by the rectum, and a nutritive enema may be prepared as follows: The enema should, as is usual, consist of milk or milk with eggs or beef tea, or of milk gruel. To half-a-pint of the warm enema a tablespoonful of the Liquor Pancreaticus and 30 grains of bicarbonate of soda should be added. The enema can then be administered at once. Two ounces at a time will suffice for injection, since when more is employed it may not be retained.

Anæmia.—Spanæmia.

This condition may result from one of two causes:—

1. Deficiency of the volume of blood itself.
2. Deficiency of the red corpuscles of the blood.

The proportion of water is increased, and the solid constituents of the blood generally may be deficient more or less. Since there is no actual disease the condition may be termed Simple Anæmia or Bloodlessness.

Varieties: 1. *Acute* or *Active Anæmia*, the volume of the blood being lessened.

2. *Chronic Anæmia*, the white and red corpuscles being deficient, together with deficiency of the solid constituents of the blood generally.

3. *Progressive Pernicious Anæmia* or *Idiopathic Anæmia.*

Acute Anæmia

May arise from severe epistaxis or the extensive hæmorrhage from wounds, ulcers, etc., or it may supervene during the progress of some acute disease.

Chronic anæmia may appear gradually from starvation or from insufficient food.

It is also a result of general debility, fevers, tuberculosis, and albuminuria.

Simple Chronic Anæmia

May follow the acute form, but it usually creeps along gradually from long protracted diarrhœa, deficiency of food, light, and air. A remarkable contrast is often observed in children brought up in close, unhealthy dwellings, which are common to large towns, compared with those children who have been reared in the country.

The condition is also brought about in delicate children who, having lived in the country for the first few years of their life, are sent to some large city and put to school in an impure atmosphere and in crowded rooms.

Symptoms.—These are the same in the child as in the adult. There is great pallor of the skin, gums, and mucous membranes, debility, and liability to faint upon the slightest exertion.

The heart palpitates upon the least excitement; there is

headache, impaired and capricious appetite; the bowels are costive, and the carotids strongly pulsate.

Extreme anæmia in children, accompanied by emaciation and general cachexia, although cough and feverishness may be absent, leads to a strong suspicion of tubercle.

Anæmic Murmurs.

Three varieties of murmurs may be present in anæmia:—

1. Cardiac murmurs.
2. Venous murmurs.
3. Arterial murmurs.

The physical signs yielded by the heart's region, and by the veins and arteries of the neck, are in all probability due to the abolition of the healthy relations between the muscular tissue of the heart and the blood; the former, having become flabby, has lost its tenacity, the latter is thin and its red corpuscles are deficient.

The "murmurs" present do not depend upon any obstruction to the circulation, but are in reality "blood sounds," or hæmic murmurs. The cardiac murmur most often present is one over the pulmonary artery, coinciding with the systole of the heart. Its character is soft, its pitch low, and it is localised over the second and third left intercostal spaces, at the junction of the cartilages with the sternum.

Similar murmurs may be audible over any of the orifices of the heart in children, along the course of the aorta and even over the whole area of the heart, but their intensity is usually greatest at the base of the heart, and they are single, blowing, and soft.

The "*bellows murmur*," or "*bruit de soufflet*," is endocardial, and is generally regarded as an indication of organic disease. If, however, it is very soft and heard even at the

apex in anæmic children, it may merely denote relaxation of the mitral aperture without contraction or roughening of the valves themselves. It is possible that the blood in these cases is so watery that as it traverses the vessels it is easily thrown into vibration.

Over the large cervical arteries, and synchronous with the pulse, may be heard another murmur, soft, intermittent, and blowing. A murmur of this kind not uncommonly follows extreme loss of blood, but no accurate conclusion can be drawn from its presence alone.

Over the jugular veins immediately above the clavicles, and particularly over the right jugular vein, a continuous hum or "humming-top" sound—"*bruit de diâble*"—is heard when the anæmia is extreme, the blood being much thinned and altered.

Hæmic or blood murmurs are always systolic in period, and are never presystolic or diastolic.

Treatment.—This greatly depends upon the state of the patient and upon the cause. The most important drug is *Iron* in some form. The ammonio-citrate of iron is perhaps the best preparation, since it seldom disagrees; it may be combined with syrup and water. The tincture of the perchloride of iron and glycerine is especially indicated with a hæmic murmur. Among other remedies may be mentioned the syrup of the hypophosphite of iron, the syrup of the phosphate of iron, the compound syrup of the phosphates (Parrish's chemical food), the syrup of the iodide of iron and steel wine. The lozenges of reduced iron are often very useful. The constipating effect of the iron may be counteracted by combining with it a few grains of sulphate of magnesia.

Belladonna in doses of 2 to 5 minims of the tincture is sometimes advantageously combined with the iron salts, especially when the heart's action is rapid.

Progressive Pernicious Anæmia.

This variety of anæmia may be termed a disease which sets in without any appreciable cause, and is unaccompanied by disease of the glands or of the viscera, or even by emaciation. Its progress is rapid, and it may prove fatal in from 6 to 12 months.

Simple enlargement of the Cervical Lymphatic Glands, together with Anæmia,

is of frequent occurrence in strumous, delicate children. It may be caused by cold, ill-health, the irritation of scarlet fever or diphtheria. The glands may remain enlarged and tender for an indefinite period. They then shrink gradually, and if the constitution is good, resolution may take place. They sometimes cause no pain or inconvenience. In a delicate child of a strumous family it is common to speak of a "scrofulous" enlargement. The glands become enlarged, remaining so for some time, then suppuration takes place, and they either ulcerate, discharging caseous pus, or they may be opened if deemed advisable; an ugly puckered scar always remains.

Sometimes when unopened the matter becomes absorbed, a hard concretion being left in the neck In tuberculous children these enlarged glands may sometimes be seen, having no tendency to suppurate. In these cases the glands of the neck continue uneven, large, and without discolouration of the skin, or tenderness, and they are freely movable.

The cervical, axillary, inguinal, and mesenteric glands are those usually affected. In the neck the enlarged glands are often tender and inflamed.

Treatment.—If the cause of the irritation can be dis-

covered, such as eczema of the scalp, or carious teeth, it must be removed. The enlarged glands may be treated with the application of a weak solution of tincture of iodine, or by the infriction of an ointment; the unguentum plumbi iodidi is probably the best. If the gland is about to suppurate, poultices should be employed; and if fluctuation can be detected, a small aperture may be made with a lancet horizontally, by which means the abscess may be made to contract.

The abscess must be laid open freely, if there is any danger of the pus burrowing.

Internally, good food, iron preparations, and cod-liver oil must be administered.

Sea-side residence is of paramount importance for all children who suffer from chronically enlarged glands.

Lymphadenoma

May be defined as a scrofulous affection, associated with considerable enlargement of the lymphatic glands, and a peculiar deposit in the Malpighian bodies of the spleen. There is either a new growth in the lymphatic tissue, or this tissue becomes hypertrophied. Histologically, this affection is similar to leukæmia, but differing from it since the white-blood corpuscles are not in excess. It may ulcerate, leading to hæmorrhage, or to cheesy and fatty changes.

The size of the lymphatic glands rapidly increases with the production of tumours, which are elastic, whitish grey in colour, and of the consistence of brain. The lungs, liver, kidneys, stomach, bones, muscles and subcutaneous tissues may be implicated, a new growth of lymphatic tissue being either infiltrated through them, or being deposited as a mass or tumour in their substance.

In some cases lymphadenoma may produce leucocy-

themia. It is accompanied by cachexia and impairment of health, and follows a similar course to that of malignant growths.

The *Treatment* must consist of iron preparations, phosphorus, and cod-liver oil.

Leukæmia.—Leucocythemia.

This disease is occasionally found in children, and is characterised by a numerical increase of the white-blood corpuscles, accompanied by the formation of new lymphatic tissue in the lymphatic glands, spleen, kidneys, liver, and other organs.

In health, the white corpuscles are in the proportion of 1 to 300 of the red; and to constitute leucocythemia, the relative number of white cells must be at least 1 to 20 of the red

It has been considered by some that the proportion of white and red cells is the same, the white filling up the spaces between the red, which are arranged in rouleaux. According to another authority, the white cells in this affection are in the proportion of 1 to 10 of the red. Many of the white corpuscles are granular, large, and containing one, two, or three nuclei. The affection is sometimes associated with Bright's disease, cancer, and tuberculosis.

Symptoms.—These consist of extreme pallor, ill-health, languor, frequent vomiting, thirst, constipation, or diarrhœa. Usually there is enlargement of the spleen, the lymphatic glands, and the liver. In consequence of the alteration in the blood, there may be bleeding from the gums and from the nose.

Ascites and œdema of the lower extremities may take place.

Jaundice may result if at an early stage the liver is enlarged.

The *Treatment* is the same as for anæmia.

CHAPTER XXI.

Debility.

Under this term is included a group of symptoms commonly met with by those who have the opportunity of seeing a large number of children.

The term debility implies a functional impairment, weakness, want of tone, or unnatural slowness in performing the vital processes, independently of any discoverable organic lesion; if neglected, it may lead to structural organic changes.

Simple debility without complication may be induced by loss of blood, deficient food, free purgation, or any cause by which the vital powers of the child are reduced.

The constitution only recovers slowly from the shock, and the vital organs carry on their functions sluggishly; thus, if the process of repair is not uniform in all the organs, equilibrium is disturbed, and by degrees disease is developed when and where it was least anticipated. At the commencement of many forms of illness, it is impossible to make any diagnosis except that of debility.

The *Symptoms* of simple debility are lassitude and want of power throughout the whole system. Shock has been received by every function. The uniform working of the functions of the body has been temporarily arrested. The child makes no special complaint about anything, but it droops and hangs about, and takes no interest in its former amusements. All the liveliness of childhood has gone. Sometimes there is a timid, shy look, and there are fits of crying without the slightest cause. There is usually no pain or discomfort. The bowels are stated to be regular, but in

consequence of the small amount of food taken, the motions are generally scanty. The bowels act sometimes every day, sometimes once in two or three days; usually, the latter condition prevails. The tongue is moist and clean, or pale, but is not indicative of any active disturbance.

There is frequently a film of thin frost or a silvery whiteness on the tongue, or there may be a thicker yellowish coating. The tip and sides are of a natural colour, and the front of the tongue is never involved. The tongue may occasionally appear smooth and dusky. The pulse is small and weak, and in most cases slow.

No elevation of temperature is recorded by the thermometer. The skin often is very cool, and this is ascribed to the fact of the child not taking sufficient exercise to keep himself warm. The child is often to be observed lounging on a chair or sofa, and then dropping off into the calm prolonged sleep of fatigue. Upon being awakened, he quickly falls to sleep again, and wishes to go to bed early, the same drowsy sleep again returning and lasting until the morning. Upon a careful physical examination of the chest, nothing of importance can be elicited.

The symptoms most commonly attendant are epigastric pain and headache, indications of debility in the stomach and brain respectively. The pain in the epigastrium is dull and aching, perhaps better described as discomfort than absolute pain, and it is localised to the ensiform cartilage or its immediate neighbourhood. It may be compared to the gnawing sensation of an empty stomach waiting to be appeased by food. The headache appears to be in the form of a persistent oppressive weight across the centre of the forehead, and gives to the child a painful, dull aspect. Sometimes the eyes are heavy and hollow-looking, the expression is inanimate and desponding, but there is never squinting or intolerance of light, as may be observed when brain disease is imminent.

Indications are also afforded by the sympathetic system. These may be frequent blushing, or palpitation of the heart, induced by fatigue or by trivial causes. The ordinary diet of health may even over-tax the digestive functions under the influence of fear or emotion. It cannot be said that there is any one special symptom of the condition at present under discussion. It is the general symptoms as a whole that must be taken into consideration. The indications are negative, and the non-discovery of any specific cause denotes its uncomplicated nature. There is no tangible feature, and thus the disorder of health may creep along insidiously, and remain long undetected until some prominent symptom is developed.

A very cautious opinion must be given in these cases. Although no absolute disease can be discovered, a doubt remains as to whether some future mischief may not be the outcome of the condition.

If quickly and skilfully taken in hand, these cases end favourably, but if the condition continues it may lead to protracted disease, and even to a fatal termination. Coma, convulsions, and brain-exhaustion may result from the defective nervous power, as indicated by headache. Chorea, epilepsy, and paralysis may arise from neglected cases of simple debility, which may eventually induce blood changes, from which anæmia, tuberculosis, and other forms of cachexia may take their origin.

From the observation of a large number of cases at the North-Eastern Hospital, the author is inclined to believe that these cases of simple debility are more often seen in *only* children than in the individual members of large families. The absence of playmates of or about the same age in the case of an only child is a powerful factor in the production of *ennui*, the child becoming wearied of its incessant endeavours to amuse itself unassisted by congenial

associates. Too much sedentary occupation, the child being deprived of its suitable amount of out-door exercise, and the extent, perhaps, to which education is pushed at the present day with young children, are undoubtedly causative of conditions of debility.

Vomiting is a frequent sign of a weak, delicate stomach in a young child, and this symptom is frequently arrested by a simple tonic; so powerful is the sympathy of the stomach with the brain, that this last-named organ is restored to quietude after tone has been regained by the stomach. To maintain the efficient working of the body, the most certain method is to equalise all its forces. When the nervous and digestive functions have been rendered weak, of which the evidences are loss of appetite, muscular pains, and sluggish bowels, a non-stimulating, spare diet may be sufficient to set matters right.

CHAPTER XXII.

Acute Rheumatism.

This affection, as in adults, manifests itself by painful inflammation of one or more of the larger joints, usually accompanied by a considerable amount of febrile action. In the majority of cases in children, the fever is probably not so intense, nor the course of the affection so long as in adults. The fever may be coincident with the appearance of pain and swelling of the joints, or it may precede by one or two days the inflammation of the joints. In severe cases the fever is well marked, the pulse frequent, the skin very hot,

and generally bathed in copious acid sweat. A dangerous attack may be anticipated when the temperature rises above 104° or 105° Fahr. The digestive functions are disturbed, the tongue is thickly coated, the appetite gone, or there is nausea, and the bowels are irregular, the stools being dark-coloured and fœtid. Sometimes the wrists, elbows, shoulder-joints, knee-joints, and ankles are affected simultaneously, but usually only a few of these joints are implicated, the others either escaping entirely or subsequently becoming affected. A very characteristic feature is the tendency to metastasis or shifting of seat, and the intense pain and heat may be transferred to some distant joint within twenty-four hours. The heat of the inflamed part is always greatly increased, and according to Aitken it is not unusual to find the temperature varying from 100° to 105° Fahr.

The *swelling* is usually considerable, and the shape of the parts may be much altered. With inflammation of the knee joints the patella may be raised from its position on the condyles of the femur through the amount of effusion. Over the affected joints the skin generally exhibits a more or less distinct blush. The severity of the articular affections, however, is not always commensurate with the fever, and constantly, in very young children, the local manifestations may be slight, if not entirely absent, and the only symptom of the real character of the case may be soreness, indicated by the cries of the patient when an attempt to move him is made.

The *Duration* of the attack is exceedingly variable. Rheumatism is stated to pursue a far more rapid course in children than in adults, sometimes yielding after six days, and almost always before fifteen days. It may, however, last for twenty-one days, and six weeks have elapsed before convalescence has been thoroughly established. At whatever age rheumatism occurs there is a notable tendency to relapses and second attacks, and it is not uncommon to

meet with children of twelve or fifteen years of age who have suffered from three or four attacks of the complaint.

Causes.—Rheumatic fever is very uncommon in early infancy: it has, however, been seen at the age of seven months. It is usually caused by damp and cold, and by sudden alternations of temperature combined with insufficient clothing.

Complications.—The most important are endocarditis and pericarditis and chorea.

The *Prognosis* is good when the malady is uncomplicated, but grave when it is associated with pericardial and endocardial inflammation.

Treatment.—The indications for treatment are to assist the elimination of the materies morbi (which is believed to be lactic acid), to alleviate pain, to guard against complication, and to assist convalescence by suitable nourishment and tonics. Bicarbonate of soda, acetate of potash, and bromide of ammonium, may be given internally. Nitrate of potash often proves beneficial when the fever is well marked. Salicylic acid will probably be found serviceable after the intensity of the fever is lessened; and especially when the patient is sallow and anæmic the tinctura ferri acetatis may be given. After the subsidence of acute symptoms alkalies may be withheld, and quinine given.

To relieve pain, opium may be cautiously administered. This drug should be given in small doses, at short intervals, and is very advantageously exhibited in the form of pulvis ipecacuanhæ compositus, by which a combined diaphoretic and sedative action is obtained. The painful inflamed joints may be bathed with sedative liniments, as chloroform, tincture of opium, or sweet oil, and covered with cotton and oiled silk, so as entirely to exclude the air.

If constipation be present, mild saline aperients or laxative enemata may be administered. To prevent complications,

all exposure to damp and vicissitudes of temperature must be sedulously avoided, attention being paid to the temperature of the patient's room, and to his clothing. Confinement to bed is absolutely necessary.

With regard to diet, if the child is vigorous and the fever well marked, the diet, at the commencement of the attack, should consist of milk and water, but when the fever has subsided, or in the case of a feeble child, meat broths or boiled eggs may be given with advantage.

If the membranes of the heart are endangered (indicated by frequency of pulse, oppression, and sudden pain in the heart region, even before any murmurs are developed) local depletion by cupping or leeches will be indicated.

CHAPTER XXIII.

DISEASES OF THE LARYNX AND TRACHEA.

Laryngitis.

Definition.—Inflammation of the larynx.

Acute Laryngitis.

Symptoms.—Acute Idiopathic Laryngitis is a somewhat rare disease, but the symptoms are the following:—There is pain in the larynx, aggravated by pressure, a full rapid pulse, general fever, great difficulty of breathing, stridulous cough, and threatening of suffocation; the child pulls at the throat and gasps for breath. In extreme cases the lips become livid, the voice is lost or reduced to a mere whisper. Coma and delirium may supervene, and death occur in a few days.

Causes.—Exposure to damp and cold; excessive use of the voice; the extension of inflammation from the vicinity of the larynx, as occurs in erysipelas, measles, small-pox, and scarlatina; mechanical and chemical irritants, such as drinking scalding water from a kettle, or swallowing the mineral acids or caustic alkalies.

Treatment.—Bleeding, or leeches may be applied to the throat; tartar emetic in the form of vinum antimoniale may be given in doses of 10 to 20 minims in a saline mixture. Inhalations of steam with tincture of benzoin are advantageous, but the use of local remedies is doubtful.

Tincture of aconite may be given in drop doses every hour; wet compresses covered with oiled silk are sometimes serviceable. If œdema of the glottis takes place, scarification or tracheotomy must be performed.

Nutritive enemata are indicated if severe dysphagia is occasioned.

Chronic Laryngitis

Consists of a chronic inflammatory condition of the superior portion of the larynx, with thickening of the mucous membrane.

The cough is of a rough, harsh, and tearing nature. The voice is hoarse, becoming at night stridulous, or what is called croupy. The uvula is generally considerably relaxed and elongated, dropping over the trachea and tickling its orifice, so that when the child is in the horizontal position it causes a frequent tearing cough, which may continue for some hours.

Occasionally after frequent fits of coughing a pellet of darkish-coloured mucus is thrown up, the attack terminating abruptly, but in the majority of cases the paroxysm wears itself out, and in the middle of the night, or as the early

morning advances, the patient falls asleep, being apparently well next day, but the attack coming on again the next night.

For the *Treatment* of this condition flannel should always be worn next to the skin, both in the summer and in the winter, and never left off. The neck and arms should be carefully covered. Chills must be carefully avoided. Generous diet must be given, and very small doses of morphia are sometimes serviceable.

For a relaxed uvula, alum gargle, or solution of chloride of iron, or glycerine of tannin, may be employed. Ice should be given to suck.

In some cases removal of the uvula is necessary.

Croup.—Infantile Laryngitis

is a very common disease among children, and is vulgarly called croup, and although essentially the same as the acute laryngitis of the adult, it presents many peculiar features. The aperture of the glottis in children is very narrow, and in consequence *stridulous* breathing is very common, and hence the common name "croup."

The word *croup* in itself implies nothing more than noisy or stridulous breathing. It is a Scotch word, and in Scotland, even at the present day, nothing is more common than to say to a person who has a cold, "Why, you are 'roupy' to-day," —the words "roup" and "croup" being used indifferently. It has no medical or etymological significance, and might be advantageously struck out of our nosology. The word croup is highly objectionable, because it denotes different diseases in different countries; and in England does duty for at least three totally distinct affections, the only character in common being noisy breathing.

Infantile laryngitis is distinctly inflammatory, and presents the following symptoms: A child, usually from one or two to five years of age, may have previously suffered from catarrh and fever, which has not attracted much attention; in the evening or middle of the night it suddenly wakes with a hoarse, suffocating cough and stridulous inspiration. The face is flushed, the skin hot and dry, the pulse full and strong, and breathing difficult; there is urgent fear of suffocation. The above combination of symptoms constitutes the so-called "croup"; but notwithstanding the apparent urgency of these cases, nearly all of them recover.

After continuing for some hours the symptoms abate, the child falls asleep, and upon waking little disturbance remains beyond a hoarse cough. The next night, perhaps, the attack returns, but with less severity, and after appropriate treatment complete recovery takes place.

Pathology.—There is inflammation of the larynx, usually extending more or less into the trachea, and even into the bronchial tubes. The mucous membrane is swollen, the sub-mucous tissue infiltrated, the follicles swollen, the epiglottis rigid, and the aperture of the glottis narrowed. In mild cases the inflamed parts return to their normal condition, but in other and rarer instances œdema of the glottis may result, demanding the operation of tracheotomy. In severe cases, especially when complicated with pulmonary or cerebral mischief, œdema of the sub-mucous tissue is observed, the epiglottis and glottis containing serum or pus. It is stated that the vocal cords are sometimes the seat of superficial ulcerations.

Causes.—Unfavourable atmospheric agencies; the winter season. It is not a contagious or infectious disease, but children placed under the same conditions of weather and exposure may be affected simultaneously.

Laryngismus Stridulus, Thymic Asthma, or Spasmodic Croup,

Is a very common disease in infancy, to which period it is peculiar. It is characterised by a loud crowing inspiration, often coming on suddenly at night, threatening suffocation, and in some cases ending fatally. There is little or no feverishness, no false membrane, no inflammation, and in fact the disease essentially consists in a spasmodic contraction of the glottis, thus narrowing the aperture and occasioning *stridulous* or croupy breathing. It exhibits a tendency to recur at intervals, frequently once or twice a year. The vocal cords are spasmodically closed, and unless the spasm can be relaxed the child dies of suffocation.

Post-mortem examination may throw no light whatever upon the malady, and it is probable that the affection, in this respect, bears the same relation to diseases of the throat as asthma does to diseases of the lungs, and angina pectoris to diseases of the heart.

Causes.—Morbid influences acting at a distance from the larynx, such as the irritation of teething, or the presence of tumours pressing upon the recurrent laryngeal nerve; worms in the intestines, and unwholesome or unsuitable food, are common causes. It is probably in many cases hereditary, and may often be observed in nervous, tubercular, and ricketty children.

Treatment.—This must consist, during the paroxysm, in lancing the gums, and the use of the warm bath. The treatment afterwards should consist in the removal of worms, if they exist; the use of mild aperients and antacids, or weaning the child, since, in some cases, the milk of the mother disagrees. In many cases, however, the disease arises from the removal of the infant from the mother's breast, and in this case a wet-nurse is the best substitute.

Diphtheria.

This disease consists essentially in the formation of a distinct pellicle or false membrane, usually appearing first on the uvula, tonsils, or soft palate, and in some cases extending no further, when the disease is comparatively mild; but should it extend downwards to the larynx or trachea, which is often the case, or even, as sometimes happens, to the bronchial tubes, it is dangerous and fatal in the highest degree.

A fatal result may arise from one of two causes: first, the presence of the false membrane in the larynx and trachea, by which the entrance of air into the lungs is prevented; and, secondly, the agency of the specific poison, which destroys life by toxic influence underlying the existence of visible local lesions.

Although diphtheria chiefly attacks the fauces and the respiratory tract, it is not limited to those situations, but it may affect the nose, the eyes, the ears, the œsophagus, the margins of the anus and vagina, and the skin. It is, nevertheless, especially a disease of the mucous membranes, and particularly of those parts of such membranes as are near one of the outlets of the body, that is, of parts exposed to the air.

The false membrane may be stripped off the back of the throat, leaving the subjacent parts spongy, swollen, and bleeding, upon which the membrane is soon renewed. The membrane itself presents several layers, the first formed becoming the most superficial, and the newest being the most deep-seated.

Diphtheria is very capricious in its visitations, sometimes attacking whole communities, especially among children, with terrible and fatal results; but being sometimes entirely absent for many years, or appearing only in a sporadic form.

Diphtheria confined to the larynx and trachea is appropriately termed laryngo-tracheal diphtheria, and the affections with which this disease may be confounded are the following, viz., infantile laryngitis, and laryngismus stridulus. The latter may be distinguished by the suddenness of the attack, the speedy convalescence, or death, and the absence of all false membrane. In infantile laryngitis the symptoms are those of acute inflammation of the air passages; there is hoarse, loud barking cough, great dyspnœa, hot skin, a full and rapid pulse, and the attack is sudden, generally occurring in the night. Death by suffocation rarely occurs, although this result sometimes appears urgent, and, as a rule, the great majority of cases recover under appropriate treatment.

In laryngeal, or laryngo-tracheal diphtheria, the symptoms are, at first, apparently far less severe, and are frequently scarcely noticed. Hoarseness may be absent, and the dyspnœa not urgent, the voice is muffled, and the cough not loud. In fact, the symptoms may, at first, be called *insidious*. Still, the patient gradually becomes worse; there are fits of suffocation, sometimes accompanied by the expulsion of false membrane, and death ensues either from absolute suffocation, or, what is quite as common, by the toxical effect of the diphtheritic poison. In some cases, although comparatively rarely, the disease commences in, and is confined to, the larynx and trachea, and the existence of the false membrane may not be recognised until tracheotomy has been performed, or unless the patient dies and *post-mortem* examination reveals the true nature of the malady.

Diphtheria appears to be caused by a specific poison introduced from without, and first attacking the back of the throat, because that part first receives the air during the act of respiration. In this disease the inspired air is laden with poison, and assuming that diphtheria is propagated by germs,

the supposition is that these germs find a suitable soil in the mucous membrane of the throat, and that they increase and multiply there and elsewhere in the usual manner of vegetable and animal germs.

The subject of the relations between croup and diphtheria has occupied the attention of the medical world for many years past, but at the present day opinion is less divided than formerly, and the views first advanced some twenty years ago are fast gaining ground—viz., that the so-called membranous croup is simply laryngo-tracheal diphtheria.

The subject of the relations between croup and diphtheria has very recently been exhaustively considered in a discussion at the Royal Medical and Chirurgical Society. The occasion of the discussion was a paper read at the society by my father, Dr. Robert Hunter Semple, who has long maintained the identity of membranous croup and laryngo-tracheal diphtheria, and a committee was appointed to report upon the subject. The report is a lengthy one, and contains a great mass of information, and the conclusions drawn, although cautiously expressed, point to the discontinuance of the word "croup" altogether, and to the substitution of other words having a more definite meaning. The great mass of evidence collected leads to the belief that membranous croup (*i.e.* laryngo-tracheal diphtheria) is of zymotic origin; and there is an almost total want of evidence that the ordinary causes of laryngeal inflammation give rise to diphtheria.

Treatment.—In the mild cases where the fauces only are affected, some local alterative should be employed, such as a strong solution of iron, but the constitutional treatment should never be neglected, because even in slight attacks the constitutional symptoms are often serious. Iron and quinine should, therefore, be given, and wine or brandy, and strong beef-tea be also administered. Where the disease

attacks the larynx or trachea, the danger is multiplied a hundredfold, and there is little chance for the patient, except in tracheotomy, by which the false membrane is removed.

The term "croup," then, does duty for three totally different diseases, viz. :—

1. *Infantile Laryngitis*, or *Inflammatory Croup*, which is distinctly inflammatory, but in which there is no false membrane.

2. *Laryngismus Stridulus*, or *Spasmodic Croup*, in which there is no inflammation and no false membrane, but which merely consists in a spasmodic contraction of the vocal cords.

3. *Laryngo-Tracheal Diphtheria*, or *Membranous Croup*, which is characterised by a distinct false membrane, but in which the inflammatory symptoms, in most cases, are by no means well marked, and for this last-named reason Bretonneau substituted the word *diphtheria* for diphtheritis.

In respect to the identity or non-identity of so-called "croup" and diphtheria, it is not attempted to assert that these affections are identical, because diphtheritic membrane is seen upon mucous surfaces remote from the larynx, and also upon ulcerated wounds ; but inasmuch as no difference, microscopic or other, can be detected in the false membrane lining the larynx in *membranous* croup and laryngo-tracheal diphtheria, it is in the highest degree probable that *membranous* croup and diphtheria confined to the larynx and trachea are one and the same affection.

CHAPTER XXIV.

DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

Cerebral Meningitis.

Definition.—An inflammation of the *membranes* of the brain. This affection may be divided into two

Varieties.—(1) *Simple Meningitis.*

(2) *Tubercular Meningitis*, or *Acute Hydrocephalus.*

Simple Cerebral Meningitis.

Symptoms.—These are, general fever, acute headache, obstinate constipation, vomiting, intolerance of light and sound, contracted pupils, sleeplessness, flushed face, and suffused eyes, succeeded by a comatose condition, with dilated pupils (indicating the occurrence of serous effusion), and often terminating in twitchings, convulsions, paralysis, diarrhœa, and death. These symptoms are also common to cerebritis, or inflammation of the substance of the brain, from which disease this form of meningitis is not to be separated, since it is probable that the brain substance is rarely the seat of inflammation which does not spread to the membranes, and *vice versâ.*

Causes.—These may be the infectious fevers (?), erysipelas, or exposure to the direct rays of a burning sun (insolatio or sunstroke), or the foolish proceedings of some mothers who wash their children close to a large fire with their heads almost in the grate.

Pathology.—An inflammation of the brain membranes. On post-mortem examination, the vessels of the pia mater

are found to be enlarged and engorged with blood, and the arachnoid is opaque, serum and lymph being situated beneath it.

Treatment.—This must be antiphlogistic. All causes of excitement should be avoided; the child must be placed in a darkened room; cold evaporating lotions, such as spirits of wine lotion and hydrochlorate of ammonia in solution, or ice bags, should be applied to the head. A few leeches may be applied to the temples.

Calomel, in small doses, every three or four hours, should be given internally; saline aperients may be exhibited with advantage. Tartar emetic has been recommended by some authorities, but its utility is more than doubtful, and its tendency to produce vomiting is an argument against its administration.

With some physicians opium has found favour, and in some special cases its use may be advantageous, but as a general rule this drug should be avoided in inflammatory or congestive diseases of the brain, and especially in the treatment of children it should be used with the utmost caution.

After effusion has occurred, as indicated by the comatose condition and dilated pupils, mercurials should still be administered, but together with iodide of potassium, in fairly large doses, according to the age of the child.

Hydrocephalus—Water on the Brain,

May be defined as an affection of the membranes of the brain in children, leading to watery effusion, and consequent enlargement of the head.

The disease is divided into two

Varieties.—(1) *Acute Hydrocephalus, or Tubercular Meningitis.*

(2) *Chronic Hydrocephalus.*

Acute Hydrocephalus, or Tubercular Meningitis.

Symptoms.—These may vary at the commencement of the attack; loss of appetite, nausea, vomiting, and general fever sometimes precede; sometimes high fever sets in, sometimes the disease begins very slowly and obscurely, and sometimes the child is suddenly attacked. The disease usually terminates, in a few days, either in recovery or in death, but in some cases it is considerably protracted, and may be followed occasionally by the chronic form.

Although the following stages are not always clearly defined, the disease may be conveniently so divided:—

Stages.—3.—(1) *Excitement.*
(2) *Effusion.*
(3) *Flickering Stage, or Stage of Apparent Improvement.*

1. *Excitement Stage.*—There is acute pain in the head, great sensibility to light and sound, flushed face, hot dry skin, the *pulse hard* and *quick*, *vomiting*, and *contracted pupils*, extreme restlessness, incessant moaning, the child if asleep often awakes screaming, and if old enough to speak, raises the hand to the head, uttering the hydrocephalic cry, "Oh, my head, my head!" In infants there is at first strong pulsation in the fontanelles, which afterwards become tense and bulged outwards. The bowels are usually confined, but if opened the motions are scanty, clay coloured and offensive.

2. *Effusion Stage.*—After a variable period the violent symptoms abate, the pain becomes less, the child keeps up a low moaning, lethargic torpor succeeds, the fingers are clenched upon the thumb, the *pulse* is *slow* and *intermittent*; the respirations are often interrupted by deep sighs, the

pupils become widely *dilated* and no longer contract by exposure to light.

3. *Flickering Stage, or Stage of Apparent Improvement.*—In this stage there is an apparent improvement in the symptoms; the child becomes more lively, and perhaps takes some slight notice of what is going on around it; but the *pulse* soon becomes very *rapid* and *intermittent*; squinting (*strabismus*), convulsions, and paralysis succeed, and the case proceeds to a rapidly fatal termination. In fact, the apparent improvement in the child merely inspires delusive hope, and must always be regarded as precursory to death.

Causes.—Among the *predisposing* causes may be mentioned the scrofulous diathesis and hereditary phthisis, and among the existing causes is dentition, since the disease is usually developed at the time of the first dentition, viz., from the 1st to the 5th year.

Pathology.—Inflammation of the membranes of the brain in strumous subjects leading to effusion. On post-mortem examination, the ventricles of the brain are distended with limpid or turbid serum, often of considerable amount; lymph is observed in various parts of the brain, especially at the base, about the optic commissure, and also between the membranes, the cerebral substance is often softened to a creamy consistence, the convolutions are flattened, the pia mater is unusually vascular, the arachnoid opaque; minute opaque or semi-transparent bodies, single or in patches, or large portions of tuberculous matter from the size of a millet seed to that of a pea, are often found upon the surface of any of the membranes of the brain and in its substance. There are usually tubercles in other parts of the body, especially in the mesenteric glands.

Treatment.—If the child be robust, it may be placed in a warm bath, a few leeches may be applied to the temples, or the ice-bag and cold evaporating lotions to the scalp; in every case light and sound should be excluded, and one grain of calomel mixed with a little sugar should be placed on the tongue every three or four hours; saline aperients, as tartrate of potash, may also be given combined with syrup of senna. When effusion comes on, iodide of potassium may be employed with advantage, followed by the administration of the syrup of the iodide of iron and cod-liver oil.

Hydrencephaloid Disease, or Spurious Hydrocephalus.

Symptoms.—This is an affection which is frequently mistaken by mothers for the true form, and they will constantly ask, should the child have a somewhat large head, if it is suffering from water on the brain; the symptoms and points of distinction from the true form, however, are the following: there are excitement, irritability, and sleeplessness; the cheek is pale, the skin cool or cold, but there is *no vomiting*, *no alteration of pupils*, and febrile symptoms are absent, with the exception, perhaps, of a transient and occasional flushing of the face. In infants, the fontanelles are *depressed*, not swollen. Notwithstanding the apparent urgency of many cases of spurious hydrocephalus, it may be confidently asserted that almost every case ought to, and does, recover under appropriate treatment.

Causes.—This condition is due to eccentric causes of irritation, such as dentition, intestinal irritation; worms; improper, deficient, or unsuitable food, or to a general weak state of the health, or cachexia.

Treatment.—This must depend upon the cause. If worms are present they may be expelled by injections of quassia or

common salt, and the internal administration of vermifuges, as pulvis jalapæ compositus, pulvis scammonii compositus, santoninum, etc. At the same time, the general health should be supported by cod-liver oil, iron preparations, and good nourishing food judiciously employed; if dentition be the cause, the gums should be lanced. In all cases the bowels should be cleared by hydrargyrum cum cretâ, and some mild antacids, as soda and magnesia, should be given.

Chronic Hydrocephalus

Sometimes may follow the acute form, but children are occasionally born with the malady, in which case it constitutes one of the causes of tedious labour. It usually takes place between birth and eight years of age, and is generally caused by some hereditary predisposition.

Symptoms.—These are very insidious, but may include drowsiness, languor, strabismus, vomiting, constipation, and convulsions.

When the chronic form succeeds the acute, the head enlarges by degrees, the fever, headache, and other symptoms, subside, but it more often happens that the affection insensibly originates without any preceding acute stage.

The head sometimes becomes of an enormous size. Fluid is contained in great quantity in the lateral ventricles, by which cause the convolutions are unfolded, the cranial bones and sutures separate, the fontanelles are full and transparent, distinct fluctuation being perceptible on pressure, the face retaining its normal size, and the expression of the physiognomy becoming extremely peculiar. In rare instances, in place of general enlargement of the head, a fluctuating tumour may be found near the occiput. Under these circumstances, since this tumour is surrounded by the brain-investments, upon pressure the fluid produces compression

of the cerebral substance, inducing convulsions and coma. In spite of the enormous enlargement, life may continue for many years.

It is stated that in some instances the intellectual faculties are highly developed, but in the majority of cases the senses become blunted, and the intellect impaired or altogether lost, with the advance of the disease. Muscular power is much weakened, the child being unable or unwilling to move, and at last the greatly distended head can no longer be supported, but droops upon the chest or shoulder. The gradual decrease in the locomotive and sensitive capabilities during the increase of the size of the head indicates the progress of chronic hydrocephalus after the child has passed the first year of its life.

Treatment.—This must consist

(1) In promoting the absorption of the effused fluid, and

(2) In improving the general health.

For the first indication, the following measures are to be recommended :—

(*a*) Calomel in $\frac{1}{4}$ or $\frac{1}{2}$ grain doses, or some other mild mercurial, twice daily, with inunction of one or two drachms of mild mercurial ointment into the shaven scalp, once in twenty-four hours.

(*b*) Diuretics of squills and digitalis, or acetate of potash and iodide of potassium.

The second indication may be accomplished by careful regulation of the diet, which should be light and nutritious; by cod-liver oil and iron preparations, quinine, etc., and by change of air and seaside residence.

The head is sometimes compressed by strapping-plaister, and, in extreme cases tapping has been employed with success.

CHAPTER XXV.

CONGESTION OF THE BRAIN.

Is of not unfrequent occurrence in children, and it may even be observed immediately after birth. The symptoms are often very obscure, but this condition may be considered present if the child is heavy and stupid—the head looking full and being hotter than usual, the countenance livid, the veins distended and dark coloured, the pulse slow, and perhaps irregular. The pupils are generally dilated, the eyes wear a vacant expression, or they are fixed with difficulty upon the same object.

A permanently convex and elevated state of the fontanelles, in addition to the previously mentioned indications, may be considered almost diagnostic of cerebral congestion.

This affection of the brain may occur at the onset, or towards the termination of an eruptive fever in children, and it must always be looked upon as a very serious indication. It may lead to inflammation of the brain, but exhibits less tendency to do so than to irritation, and it has been stated that cerebral inflammation is less likely to succeed congestion of the organ than when the lungs or stomach have been the seat of inflammation.

Brain-congestion more often leads to effusion, and this result, in some cases, may occur very rapidly. A child may be suddenly seized with convulsions, accompanied by symptoms of brain-congestion, and it may die comatose within twenty-four hours, the pia mater after death being found congested with venous blood, and the ventricles the seat of abundant effusion.

Two *varieties* may be recognised, viz. :—

(1) *Active Congestion*, characterised by an increased amount of arterial blood; and

(2) *Passive Congestion*, in which the venous blood is in excess.

Causes.—The *Active* form may occur during dentition, or it may result from exposure to the rays of a powerful sun, or from blows or falls on the head; excessive fatigue or excitement may produce it in children already predisposed to the affection.

The *Passive* form results from any obstacle to the reflux of venous blood from the brain, such as the mechanical obstruction produced by an enlarged thymus gland, or by enlarged bronchial or cervical glands, or by the pressure of a thrombus in a large vein or sinus, producing complete or partial occlusion in these situations.

It may also occur in such affections as whooping-cough, which are accompanied by severe paroxysms of cough, and during which the return of venous blood from the brain is obstructed. A languid, feeble circulation resulting from deprivation of pure air, or from insufficient or non-nutritious food strongly predisposes, if it does not absolutely induce, the condition.

Symptoms.—*Active* congestion appears suddenly, but it may be preceded for a few days by irritability and fretfulness, feverishness and disordered bowels. The leading symptoms are intense heat of head, and older children complain of headache, intolerance of sound and light; startings in sleep and muscular twitchings may take place. The pulse is rapid, there is throbbing in the carotids, and if the skull has not become ossified the anterior fontanelle becomes prominent and tense, or the brain can be seen and felt pulsating through it. If no relief can be given to these

symptoms, stupor or coma may supervene, or convulsions may ensue.

In the *Passive* form the symptoms are usually developed less suddenly; but when their character is marked they closely resemble those just described. The fever symptoms, however, the carotid pulsation, and the tenseness and prominence of the anterior fontanelle, are far less marked.

When great vascular distension only is present the symptoms may subside in two or three days, but when the congestion has been so intense as to produce serous effusion or small extravasations of blood (capillary hæmorrhages), the symptoms may assume a graver aspect, death resulting; or the attack declines, more or less paralysis remaining. In some cases, however, complete and unlooked-for recovery takes place after the grave symptoms have continued for many days, or even weeks.

Treatment.—This really embraces the general treatment of meningitis. Cold may be applied to the head, aperients, and full doses of bromide of potassium may be exhibited. The diet should be low, and the patient placed in a dark, cool room.

Small doses of belladonna preparations may be administered. Lastly, in some cases, a few leeches may be applied to the scalp.

Encephalitis, Cerebritis, or Inflammation of the Brain Substance

Is a very rare affection in children, but it may result from injury. It is very probable that the affection always co-exists with meningitis, and it may be preceded by congestion. It may appear suddenly with convulsions, either general or partial, being succeeded by difficulty or loss of power of articulation, distortion of the face and eyes, considerable

stupor eventually supervening. Temporary consciousness may return, succeeded by a second attack of convulsions, which may be followed by squinting, insensibility, or complete hemiplegia.

Death usually results in a few days, but in some cases the course is less rapid and of a somewhat different nature. The affection may begin with derangement of health, disordered bowels, and constant vomiting; the pupils are dilated, the eyes heavy, and there is stupor and dulness; some days may elapse before the occurrence of a convulsion, which, however, is soon followed by a condition of coma rapidly proving fatal. It has been stated that vomiting at the commencement of the seizure indicates an affection of the cerebral mass, and that the occurrence of convulsions points to lesion of the membranes.

Otitis, or *Inflammation of the Internal Ear*, may give rise to encephalitis, in which case the symptoms will be those of the local disease. Thus, there are pains in the ears, purulent discharge (otorrhœa), preceding the brain inflammation, the course of which is often very insidious; delirium, vomiting, rigors, fever, spasm, or paralysis of the muscles of the extremities of the face, hemiplegia, coma and death may take place.

The *Prognosis* in every case is very unfavourable.

Pathology.—There is great congestion of the cerebral vessels, with general vascularity. There is effusion of serum into the ventricles and beneath the pia mater, which membrane is especially vascular. The cerebral substance may be softened. The sinuses are filled with coagulated blood. Since meningitis nearly always accompanies encephalitis, the characters common to the two affections may be combined.

Treatment.—Bleeding is sometimes necessary, but it must be performed very early in the illness. At the commence-

ment half a dozen leeches may be applied to the scalp. Jalap and calomel or grey powder may be given in moderate doses. Ice and cold to the head are serviceable. Iodide of potassium and aconite preparations in small doses are also useful remedies.

Cerebral Hæmorrhage.

Apoplexy of the brain consists in an effusion of blood into the brain substance, and is in children a very rare disease.

Symptoms.—These resemble those in the adult; they are drowsiness and headache, slowly passing into stupor, or the attack may occur suddenly, appearing in the form of paralysis, coma, and convulsions.

Pathology.—There is a clot in the brain most commonly seen in the optic thalami or corpora striata, and sometimes softening is present round the clot.

Apoplexy of the Meninges

Is more common than apoplexy in the brain substance, effusion taking place into the arachnoid cavity. Hæmorrhage is rare in the ventricles. It is seldom accompanied by paralysis. At once there appear convulsions, frequently returning; spasmodic contractions of the hands and feet, vomiting, squinting, intense thirst, fever, and dusky hue of the countenance are usual accompaniments. The convulsions recurring with greater frequency, the case soon proceeds to a fatal termination.

Occasionally the attack may be of a more sudden character, being indicated by drowsiness, succeeded immediately by coma and convulsions. The two varieties are dependent upon the relative quantity of effusion present; protracted and exhausting illness may induce passive hæmorrhage into

the arachnoid membrane; but in this case the symptoms are very insidious.

Pathology.—Certain changes take place in the blood, according to the length of time that has elapsed since the effusion. The blood is at first fluid, but by the fourth or fifth day it becomes coagulated, the serum becomes absorbed, and the clot adheres to the parietal serous membrane. The colour gradually fades, the clot becoming at first a thin, fibrinous lamella, resembling a false membrane; no opening can usually be found through which the escape of blood has taken place.

When tubercle of the brain is found in children it is not unusual to discover a so-called

Capillary Apoplexy,

i.e., a limited apoplexy, consisting of numberless blood-points (puncta vasculosa or cruenta).

Treatment.—The same rules are applicable as in dealing with meningitis, and the symptoms must be combated as they arise.

Cerebral Hypertrophy

Is generally seen in scrofulous and rickety subjects, and in infants from six to eight months old. In this form of disease the hypertrophy is chiefly occipital, the head is not so large, nor are the sutures and fontanelles so open as in hydrocephalus; and in hypertrophy of the brain there is sinking and depression of the anterior fontanelle and sutures rather than prominence and tenseness of these structures, as is the case in hydrocephalus. The child is usually drowsy, dull, and apathetic, its appetite is ravenous, and giddiness and headache are often present.

The patient lies in the horizontal position, or flings the head backwards, boring, with the occiput especially, into the pillow. Dyspnœa is also a noticeable and prominent symptom, and the child is often well nourished. The head is nearly always bathed in profuse sweat, and the cerebral souffle is audible. Diagnosis may be considered complete if the fontanelles have closed, this event being followed early by convulsive attacks, which have been at first partial, lasting only for a short time, and subsequently taking on an epileptiform character.

Pathology.—The general aspect of the cerebrum is anæmic, unless death has occurred from the supervention of some attack of brain-congestion. The grey matter is little, if at all altered; but the white matter is stated to be firmer than normal, and its size increased by the infiltration of amyloid material into the granular matter between the nerve fibres. These changes do not appear to invade the base of the brain or the cerebellum, but are mostly observed in the hemispheres. Enlargement of the thymus gland is not uncommon, and thymic asthma has been thought to produce the dyspnœa above mentioned.

Death is not the inevitable termination, but it may result from compression, especially when ossification of the sutures has taken place; and life may be destroyed by an attack of convulsions.

In rare cases the child recovers, but grows up idiotic. The immediate cause of death is often some complication, as scarlatina or whooping-cough.

Treatment.—Attempts must be made to improve the general health. The head may be painted with tincture of iodine. Iodide of potassium in moderate doses may be exhibited, and bromide of potassium is often useful. The scalp may be sponged daily with cold water, and at night the head should be covered with a thin cap to obviate

catching cold, to which the child is exceedingly susceptible, since the head is bathed in sweat. Free purgation must be employed, in the hope of obviating the supervention of epileptiform seizures.

CHAPTER XXVI.

INFANTILE PARALYSIS, OR PARALYSIS OF CHILDHOOD.

Paralysis in children may be divided into four chief *Varieties:*

1. Obstetrical Paralysis.
2. Paralysis consequent upon cerebral disease.
3. Infantile Paralysis proper.
4. Paralysis of Duchenne, or Pseudo-hypertrophic muscular Paralysis.

Obstetrical Paralysis

Occasionally results from the pressure exerted by one blade of the forceps on the portio dura of the seventh nerve at its exit from the stylo-mastoid foramen. Paralysis of the upper extremity may take place during the operation of turning, since by undue violence the brachial plexus may be lacerated or injured.

Paralysis consequent upon Cerebral Disease

May result from meningitis, apoplexy, hydrocephalus, and brain tumours; and it may follow rheumatism, diphtheria, typhoid fever, and scarlatina. Hemiplegia, following menin-

gitis, has been observed in a child nineteen months old. Paralysis is sometimes associated with dentition, laryngismus stridulus, and convulsions; and facial paralysis may result from disease of the petrous portion of the temporal bone.

Infantile Paralysis Proper,

Sometimes called Infantile Spinal Paralysis, occurs in young children, and its exact nature, even now, is not thoroughly understood. It shows a special tendency to affect children under two years of age. Sensation is totally unaffected, the paralysis being intrinsically motor. The invasion is usually sudden, is accompanied by pyrexia, and terminates in atrophy of the muscles and complete paralysis. The limbs are not always affected exclusively. The lumbar muscles may be implicated, and the spine curved to a greater or less extent. No morbid appearances are found in the brain or the cranial nerves.

Causes.—This affection is liable to occur in children who have suffered from previous ill-health, or from febrile or nervous affections; or it may follow cold and convulsions, diphtheria, ulcerated sore throat, or some eruptive fever. Blows and falls on the hip may produce the disease. Delayed dentition in a rickety child must also be regarded as causative.

Symptoms.—The paralysis may come on in a few hours. Inability to stand is sometimes the only symptom. There is usually no pain.

There is sometimes febrile disturbance, lasting some days, accompanied by thirst, anorexia, screaming, headache, and convulsions. The legs are the limbs more often affected, although in some cases the arms alone may be affected; sometimes one arm or one leg, or one leg or one arm of the opposite side, or the same sides, are the seats of the paralysis.

The right leg is the most common seat, and in rare cases both legs and both arms are affected.

If paralysis takes place in one arm—let us suppose the right—the child will use the left hand for drinking and eating purposes, never using the right hand at all. The fingers and thumb may be spread wide apart, and the back of the hand presents, on extension, a concave aspect. The hand drops useless at the wrist, the thumb is bent inwards to the palm, and there is looseness of the articulations of the phalanges. When the leg of the same side is the seat of paralysis, constituting hemiplegia, the child moves unsteadily, less freedom being exhibited than in the sound side. The child turns on the foot, the ankle-joint simultaneously being bent inwards, so that he rests chiefly on the inner border of the foot.

The muscles of the thigh, those of the gluteal region, gastrocnemius, and muscles of the feet are often much wasted; the affected limb generally feels colder than the sound one, since the blood-vessels are diminished in size. The toes frequently look blue, and a liability to chilblains is not uncommon. The atrophy is sometimes so considerable that the bone is merely covered by skin. Deformity of one or both feet is not rare. The flexor muscles frequently become contracted permanently in infantile paralysis, since the extensor muscles are more often affected than the flexors. No contraction of the muscles takes place under faradization, since reflex excitability is soon lost. An excess of phosphates is often observed in the urine. The chief points of distinction between the so-called infantile form and other forms of paralysis are, the absence of pain, of irritation of skin, and of bed-sores.

Pathology.—The latest observations of this affection seem to indicate an inflammation of the anterior cornua of the grey matter of the spinal cord, from which arise the spinal

nerves. Atrophy of the large cells takes place, being followed by their subsequent disappearance. Charcot is of opinion that the disease commences with inflammation of the ganglionic cells of the anterior cornua of the grey matter of the spinal cord, which by degrees extends to other situations. The cervical, dorsal, and lumbar portions of the cord may be affected, but the dorsal is the least often implicated. It occasionally happens that the muscles increase in bulk instead of shrinking. In cases which have proved fatal after having lasted for some years, the posterior cornua are found healthy, the anterior cornua being wasted and their cells disintegrated. There is flaccidity and atrophy of the muscles, which are to some extent replaced by fat, and the interstitial tissue is hypertrophied; the bones are shorter, the tendons smaller, and there is enlargement of the medullary canal.

Treatment.—Absolute rest is imperative; fever symptoms must be combated with saline aperients and other appropriate remedies. A few leeches to the spine or counter-irritation by vesicative liniments may prove of service. Subcutaneous injection of ergotine has been recommended, since this active principle is stated to control hyperæmia by contracting the small vessels of the spinal cord. Belladonna also controls hyperæmia of the cord and its membranes. Iodide of potassium in small doses, combined with some vegetable infusion, may prove useful. Quinine, iron preparations, and strychnia are also considered beneficial. The affected limb should be exercised daily, and friction should be employed constantly. When the paralysis is advanced, no benefit can be expected except from faradisation and galvanism.

The continuous current should be applied to the affected muscles at first two or three times a week, and eventually more often. It should be used for about a quarter of an

hour at a time, increasing the power of the current by degrees, as improvement results. After a time the induced or Faradaic current may be used in place of the continuous variety.

This form of paralysis is sometimes very chronic and obstinate, and the treatment has been continued in some cases for months and years. The apparently most hopeless cases may recover completely under proper local and constitutional remedies. The warmth of the affected muscles may be maintained by enveloping them in stockings of "chamois leather" or "pure spun silk." In some cases the seaside or mountain air is valuable.

Paralysis of Duchenne, or Pseudo-Hypertrophic Muscular Paralysis,

Is a rare form, associated with enlargement of certain muscles. The children of the rich are more liable to this paralysis than those of the poor, and it may occur in those who previously have been vigorous, and who have passed well through the teething period.

It is said to be most common in dull and idiotic children.

There is no fever, and the disease is very slow in its progress.

Symptoms. — There is weakness in the lower limbs, eventually succeeded by loss of reflex excitability. If old enough to walk, the child plants the foot cautiously and timidly to the ground, and moves with a shuffling gait; at each step he swings the arms and sways the body from side to side; upon meeting with any obstacle he is apt to tumble, and is unable to get up unless assisted. When standing, the feet are spread apart, and the toes turned outwards. The following action is considered *pathognomonic* of the

malady. When an attempt is made to rise from the ground, the child bends one knee, supporting himself by placing his hands upon it or upon some near object; then he bends the other knee into the position for kneeling, and in this manner, grasping the thighs from below upwards, raises the body and shoulders by degrees into the upright position, proceeding very gradually and cautiously, as if afraid of falling.

Attention is first called to the disease by the child being unable to walk when old enough so to do, or by its being very weak on the legs when the period has arrived at which it can stand by itself, walk, or run. After the muscular weakness has continued for many months, the muscles of the leg become *larger*, and in course of time those of the buttocks and loins also may become enlarged, resembling the increased muscularity occasioned by healthy exercise.

The condition of hypertrophy may last for many years, gradual and complete paralysis ensuing, and motor power being lost in the unaffected muscles, whilst the size of the hitherto enlarged muscles now diminishes. The child may eventually succumb to some visceral affection.

The *Prognosis* is always very serious. The disease usually extends upwards, implicating the muscles of deglutition and respiration, death taking place either from asphyxia or exhaustion. Some intercurrent affection is usually the immediate cause of death.

Pathology.—The muscles of the calf of the leg become overgrown. Upon section in one case the gastrocnemius resembled a fatty tumour, presenting a mass of greasy fat, with entire absence of muscular redness. Microscopically there appear degenerations both in number and size of the muscular fibres, with considerable hypertrophy of their connective tissue. The affected part of the muscle is freely covered with fat.

Treatment.—This is very unsatisfactory, and can only be

palliative; friction, galvanism, and methodic muscular exercises may be tried. Internally, cod-liver oil, phosphorus and arsenic preparations may be exhibited.

CHAPTER XXVII.

EPILEPSY, OR FALLING SICKNESS,

May be defined as a malady characterised by fits occurring at irregular intervals, with sudden loss of power and motion, attended by convulsions, and usually followed by deep sleep.

Symptoms.—These are very similar to those in the adult. The child usually falls down, uttering a piercing shriek, immediately afterwards becoming violently convulsed and senseless. The face is at first pale, but it afterwards becomes congested, flushed, and much distorted; there is gnashing of the teeth; the pupils are *dilated*, and insensible to light; there is foaming at the mouth, the tongue is thrust forward, and often bitten; the breathing is laborious; by degrees these urgent symptoms abate, and are followed by insensibility, and apparently deep sleep, or a comatose condition, from which the epileptic recovers exhausted and entirely ignorant of what has taken place. The convulsions are at first *tonic*, but they afterwards become *clonic;* the urine and fæces may be expelled involuntarily; bruises are sometimes observed upon the body from falls, and severe burns have occurred from the patient falling into the fire.

The attack is sometimes preceded by *warnings*, such as headache, giddiness, dim vision, and the so-called *aura epileptica*—a sensation which has been differently compared

to a stream of cold water, or a current of warm air, or the creeping of an insect, commencing in the extremity of a limb, and gradually ascending towards the head, and at the termination of which *aura* the epileptic paroxysm begins.

The attack is sometimes almost immediate, but at times many hours have intervened after the first warnings.

The mind gradually becomes enfeebled, and there is loss of physical and mental energy during the intervals. Epilepsy is more common in females than in males after seven years of age.

Epileptic Vertigo is the name applied to an epileptic condition in which the unconsciousness may last only for a few moments, and in which there is no falling or convulsions; in fact, this condition corresponds to the "*petit mal*" of the French, in contradistinction to the "*grand mal*" characterising a severe case of epilepsy, and in children the nature of the seizure is frequently more that of the former than the latter.

The *prognosis* will depend not so much upon the severity of the fits, or their speedy return during a limited period, but upon their recurring after teething or any other evident irritative agency has ceased, and when in other respects the health of the child is good.

Causes.—These may be divided into Centric and Eccentric.

Centric causes are: Tumours pressing upon the brain or any part of the nervous system; plethoric condition of the cerebral vessels; anæmia of the brain and of the spinal cord.

Eccentric causes are: The irritation of worms in the intestines, indigestible food, and dentition.

Epilepsy is often hereditary, and is frequently observed in the offspring of intemperate parents.

Pathology.—Post-mortem examination very often reveals

nothing more than congestion of the cerebral vessels; but in some cases thickening of the membranes and of the skull-bones, spicula of bone and internal nodes, have been observed.

Treatment.—During the fit the child should be placed in the horizontal position, and the tight parts of the dress loosened, a piece of wood or cork or a roll of linen being placed between the teeth to prevent the tongue from being bitten.

Cold evaporating lotions may be applied to the head.

During the interval the general health must be improved, and the laws of health strictly observed. Innumerable remedies have been advocated, and among them nitrate of silver (objectionable, since it sometimes causes permanent blackening of the skin); oxide of zinc, sulphate, lactate, phosphate, valerianate of zinc, and sulphate of copper, have all been recommended; belladonna was held in high esteem by Trousseau.

Bromide of potassium, in somewhat large doses, undoubtedly wards off the attacks, but it is questionable if it cures the disease, although it certainly does good, and must be regarded as a most valuable remedy.

Strychnia, nux vomica, indigo, valerian, musk, camphor, and oil of turpentine have all been tried in cases of epilepsy.

CHOREA, CHOREA SANCTI VITI, ST. VITUS'S DANCE

Is a disease specially characterised by loss of co-ordination of muscular movements. It has been quaintly termed "insanity of the muscles."

Symptoms.—The affection may appear suddenly, with irritability of temper, or disordered condition of the

stomach and bowels. The patient is unable to remain still for any length of time; the head is jerked to one side; when standing, the foot shuffles and scrapes the floor; the walk is uncertain and hurried; the affected leg is not lifted in the ordinary manner, but is dragged along as if paralysed; the features are contorted or twisted in a comical manner; articulation is impeded; swallowing is performed hastily, and with ludicrous grimaces; these symptoms are aggravated when the patient is watched. When asked to show the tongue, the organ, after some hesitation, is protruded with a jerk, and as suddenly withdrawn; when an attempt is made to raise anything to the mouth, it is sometimes jerked over the head, and frequently dropped as soon as laid hold of.

Both sides or only one side of the body may be affected; in the majority of cases the disease is limited to one side.

The specific gravity of the urine is perceptibly increased during the height of the attack, but declines as its severity diminishes.

The stomach and bowels are usually deranged, and there is often constipation; the appetite is generally capricious.

This disease usually occurs between the ages of six and fifteen; it is more common in girls than in boys in the ratio of 3 cases to 1; it is seldom fatal or dangerous, unless merging into disease of the nerve-centres or into epilepsy.

The duration of the affection may be from a few weeks to several months or years; the ordinary duration is probably about five to six weeks.

Chorea has been observed in conjunction with rheumatic fever and rheumatic affections of the heart, especially of the mitral valves.

Relapses are very apt to occur, but they are, as a rule, shorter in duration than the primary attacks.

Causes.—These are obscure: chorea is most common in

the children of nervous and hysterical women; an attack may be caused by a blow, a sudden fright or a violent fit of anger, irritation of the spinal cord or its membranes, or any irritation of the nervous system; insufficient food is probably a potent cause, since proper nutrition is curative of the affection in many cases; anæmia, rheumatism, and the presence of intestinal worms, are said to induce the affection, and Dr. Hughlings Jackson believes that it may be caused by embolism of the cerebral capillaries, and of the small vessels by which the corpus striatum and the convolutions in its vicinity are supplied.

Chorea is often acquired by imitation.

Pathology.—Death has occurred, and no organic lesion has been discovered. The post-mortem appearances are rather those of the secondary affection by which death was caused than those of chorea itself. The vessels of the spinal cord may be congested, and blood is sometimes effused round the theca vertebralis. The cerebral meninges may be affected, and serous effusion present. Softening of the brain and spinal cord has been observed.

Treatment.—A large number of remedial measures have been recommended in the treatment of chorea. If rheumatism be present, remedies addressed to this complication will be indicated, as the bicarbonate of potash or lithia; anæmia will demand iron preparations; the constipation must also be relieved.

Aperient remedies are exceedingly useful, as hydrargyrum cum creta and pulvis rhei, in doses according to the age, followed by castor oil, or some other simple aperient; more active purgatives may be employed if necessary.

Tonics are considered very useful, such as the carbonate and sulphate of iron, zinc, and strychnia; opium, cannabis indica, and various anti-spasmodics have also been advocated.

The author is inclined to believe that the most efficacious remedy is arsenic combined with iron, as the liquor arsenicalis, minims ii. or iii., with the ammonio-citrate of iron, grains v., the dose being increased according to the age.

Of a large number of cases under observation at the North-Eastern Hospital for Children, nearly every case recovered in about six weeks to two months under the last-mentioned combination; it is, however, only fair to infer, when so many remedies have been advocated as curing this affection, that chorea may terminate favourably by an intrinsic tendency; and there can be but little room for doubt that the excellent nursing and discipline contributed in no small measure to the successful recoveries in the cases now referred to.

CHAPTER XXVIII.

ECLAMPSIA NUTANS, OR SALAAM CONVULSIONS.

This affection consists in a bilateral clonic spasm of the sterno-mastoid muscles, and usually occurs in children from the period of dentition to puberty. It is very rare, and occasionally the mind is permanently impaired.

The head is bowed in a peculiar manner forward and downward so as almost to touch the knees.

The motion is at first slow, but the rapidity afterwards increases, and it may take place fifty or a hundred times in succession.

Subsequently other convulsive movements result, including strabismus; the attack may terminate in idiocy or paralysis.

Causes.—The affection has been considered due to hyperæmic irritation of the roots of the spinal accessory nerves, as takes place in indigestion and with worms in the intestine. Some think that the disease is of an inflammatory strumous nature, and that the membranes by which the medulla oblongata is invested are specially involved. It may also be occasioned by affections of the cervical cord, the pressure of tumours, and caries of the cervical vertebræ.

Treatment.—This must consist in the exhibition of sedatives, such as bromide of potassium, of tonics, as quinine, zinc and iron, and in careful attention to the general health. The constant current may be applied to the muscles and to the spinal accessory nerves, or to the head in the form of transverse and longitudinal currents.

Tetanus, Trismus Nascentium.

This is a very fatal disease, occurring in children chiefly in the first or second weeks after birth, and usually running an acute course. It is characterised by more or less general tonic contraction of the voluntary muscles, with paroxysmal exacerbations, and no complete relaxation until the end of the disease.

Although this form of tetanus generally occurs between three and ten days after birth, it has been seen in one case fifteen hours after birth, and in other cases not until the twelfth or fifteenth days. It is not common in this country.

Causes.—Certain morbid states of umbilicus and umbilical vessels, blows and accidental injuries, vicissitudes of temperature, and exposure to wet and cold, favour its development. A vitiated atmosphere, arising from filth of the house or bedding, or imperfect ventilation, are other causes.

Pathology.—The characteristic appearances are observed only in the nervous system. There is frequently intense

congestion of the brain and its meninges, and also special congestion of the spinal cord, even actual effusion of blood between the dura mater and the skull or into the arachnoid or into the ventricles. Instead of hæmorrhage, serous effusion has been found in the arachnoid space or in the ventricles. accompanied by diminished consistence of the cerebral substance. The morbid appearances in the spinal cord are similar to the above, only they are more marked and constant.

Microscopically, according to Demme and Rokitansky, the constant anatomical character appears to be proliferation of the connective tissue of the cord, the striking peculiarity being the large area over which it extends. The product is a viscous mass with abundant nuclei never advancing to a fibre-forming stage. The change is almost exclusively limited to the white meduliary substance, the grey matter appearing merely to suffer secondarily. The proliferation is chiefly in the medulla oblongata, crura cerebri, inferior peduncles of the cerebellum, and in the greater part of the spinal cord.

Symptoms.—The onset of the disease is usually gradual. Difficulty in sucking is one of the earliest symptoms. The infant is anxious to suck, pressing the mouth eagerly against the nipple, but unable to perform the act in consequence of the rigidity of the masseter muscles, and simultaneously it utters a whining, whimpering, and unnatural cry. The muscular contraction soon spreads to the other facial muscles, and to those of the trunk and extremities. The expression indicates great suffering, and wears an aged look; the characteristic *risus sardonicus* appears, and opisthotonos is frequently produced by the contraction of the dorsal muscles. During sleep there is generally a certain amount of relaxation. The slightest exciting cause, such as an attempt at swallowing, a sudden noise, a puff of air, or a

fly settling on the surface, may produce exacerbations of the tonic spasms. During the continuance of the fit the circulation and respiration are seriously interfered with. The skin may become livid, and bleeding from the nose may take place. In fatal cases the paroxysms increase in frequency, the child either dying suddenly during an attack, or passing into a comatose condition.

The prognosis is very grave, and most authorities believe that recovery never takes place after a fully established case of trismus nascentium. The duration rarely exceeds forty-eight or seventy-two hours, and death frequently results in the first day.

Treatment.—This must consist in free ventilation and cleanliness, and care in dressing the umbilical cord. The occipital region should be examined to see if the occipital bone is depressed unnaturally, since this has apparently been an exciting cause in some cases. Leeches may be applied along the spine or to the nape of the neck. Among the numerous internal remedies are ether, chloroform, chloral hydrate, belladonna, and cannabis indica. Sulphate of atropia has been administered hypodermically, the first dose being not greater than $\frac{1}{200}$ or $\frac{1}{150}$ grain : $\frac{1}{2}$ grain of the salt should be dissolved in 1 ounce of water, and 4 to 6 drops injected under the skin. Ice to the spine has been recommended. Milk, meat broths, and wine or brandy should be given in small doses and often. Anæsthetics may be employed to relax the spasmodic muscular contractions, and so enable nourishment to reach the stomach, when the rigidity of the jaw and the spasms prevent every effort of deglutition.

NIGHT TERRORS.

The term is applied to a condition in which the child goes to bed perfectly well, and, after having fallen asleep soundly, awakes in the course of an hour or so screaming and in the greatest terror. It may have dreamt that some animal is on the bed, or that it has been pursued by some savage beasts. Objects in the room are morbidly intensified to the sight, and the child will imagine that articles of furniture are huge animals, such as an elephant, etc. The child will not recognise its nurse, and can only with difficulty be quieted.

The attacks may return with remarkable periodicity about the same time night after night, or may be absent for several nights; and in the morning sometimes there is no recollection of what has occurred during the "terror."

The condition appears to run in families, several children of the same family being subject to it.

Night terrors usually depend on some gastric disturbance, and not upon cerebral disease, and, as a rule, need cause no alarm, although the possibility of the symptoms pointing to something serious must not be overlooked, as, for instance, the existence of tubercular deposit in the brain.

Pale urine, as in hysteria, is sometimes passed after an attack. Obstinate constipation is occasionally present; dentition and intestinal worms are frequent causes.

Treatment.—The child must be treated with great forbearance and kindness. Harshness will only increase the terror. The child should not sleep alone, and a light should always be left in its room. If the gums are swollen and tender, they should be lanced freely. The digestive functions must be carefully regulated by mild aperients of soda and rhubarb. The nervous excitement may be allayed by bromide of potassium, and iron preparations are useful.

CHAPTER XXIX.

IDIOCY AND IMBECILITY.

Idiocy may be defined as mental deficiency or extreme stupidity, dependent upon disease or malnutrition of the nervous centres occurring either before birth or before the evolution of the mental faculties in childhood.

An idiot is a being who becomes irretrievably defective in mental power, and is incapable of co-ordinating the functions of his brain, by reason of some cerebral abnormality existing before the brain has attained its full size, and the mind its full capacity.

Imbecility is a term generally applied to the condition in which the incapacity of the mind is less marked than in idiocy. The mental capacity of the imbecile is usually considered superior to that of the idiot. Imbecility is rarely congenital; idiocy nearly always so. The idiot is seldom so destructive as the imbecile, who often exhibits an amount of moral perception and sensibility far in advance of that which the idiot possesses, and out of all proportion to his intellectual capacity.

Abnormalities of the brain may be due to: 1, Arrest of growth; 2, arrest of development; and 3, disease—viz., hæmorrhage into the cerebral membranes. The two former may be secondary to some diseases.

Backwardness and idiocy may be distinguished from the fact that in the former there is no unusual size or shape of the head, no fits, no spastic rigidity, and no paralysis. The idiot, even in the slightest degree of the affection, shows an arrest of development of mind and body. The child who is

merely backward does not remain stationary, but his development proceeds more slowly than that of other children of his age; he is behind them in the whole course of their progress, and his delay, increasing day by day, at last places an enormous distance between him and them.

General debility and nervous exhaustion, as in recovery after acute specific diseases, may produce a temporary deficiency which may last a long time; and, although usually recovered from, may in rare cases terminate in epilepsy and death. Cases of insanity have followed whooping-cough, cerebral congestion, and intermittent fever.

Chorea of very long duration may degenerate into idiocy; but the stupidity which frequently accompanies choreic attacks is recovered from.

The following points are important in determining the condition of the brain of a child before it can talk:

1. A child's eye should follow a bright object or a bright light in two weeks after its birth; about the same time it should begin to smile. Squinting when objects are brought near them is natural to children under one month old, but not afterwards. It is no indication of brain disease, because the child at that age cannot adjust its eyes.

At three months old a child should begin to use its hands, and at the same period it should take hold; at four months old it should know faces; and from eight to nine months it should know objects by name.

From the earliest age the tongue should be kept within the mouth. At three months the child should support its head. In this last particular idiots always fail. At from eighteen to twenty-four months the anterior fontanelle should close.

3. At from nine to sixteen months a child should begin to talk; at ten to eighteen months it should begin to walk; at nine months it should feel its feet when held out to walk.

Mental deficiency is not necessarily indicated by deviations from this rule, since not unfrequently children do not walk until nearly two years old, and often do not begin to talk until about the same time.

At birth a child's brain should weigh $\frac{3}{4}$ lb.; at the end of five years, 1·5 lb.; and by the end of the seventh year it should usually acquire its full size.

Smallness of brain may result from:

1. Deficient supply of blood; 2, meningeal inflammation; 3, effusion of blood in small quantities on the surfaces of the membranes.

Largeness of head may result from:

1. Simple thickening of bone, as occurs in rickets and idiocy. It is here secondary to idiocy, not causative of it.

2. Pure hypertrophy. No idiocy or other symptoms arise until the occurrence of compression.

3. Hydrocephalus, which is frequently accompanied by idiocy.

In all cases where idiocy exists, no matter what its cause, there is usually some bodily defect, such as arrested development, heart disease, fits, spastic rigidity, and shortening of some muscles.

Idiocy may be congenital or acquired; in the large majority of cases it is the former.

From the observation of 2,000 cases of idiocy, in 45 per cent. there were found well-marked neuroses in the families of one or both parents. If the neuroses were marked on the father's side, it was found that the later-born children were affected; if on the mother's side, the firstborn children were affected.

Causes.—Scrofula and consanguineous marriages, especially if one or other parent proceeds from a scrofulous, syphilitic, or intemperate stock, are fertile causes of idiocy. It is stated that two-thirds of all idiots are scrofulous, as

is indicated by the frequent occurrence in them of skin eruptions, otorrhœa, ophthalmia, suppurating glands, and strumous ulcers. Probably quite two-thirds of all idiots die of consumption. Other causes are congenital malformations of the brain; severe fright, by which the brain-growth is arrested; injuries to the brain by falls or blows; epilepsy and convulsions; and probably, in some cases, masturbation. Fright to the mother during pregnancy is also considered causative.

To summarise briefly, the mind of the idiot remains undeveloped, except as regards a mischievous tendency; he can neither talk nor walk properly; he is frequently deformed, often deaf, and is unable to take hold of objects. Of the deformities the chief are: wad-shaped fingers, hernia, squinting, abnormal shortness of one or two toes in each foot, peculiar shapes of the ears, club foot, and coloboma of the iris. The head may be unusually small (microcephalic), or unusually large (macrocephalic), or hydrocephalic. The hair on the pubes is usually scanty, and the testicles are at times wanting. The so-called "vaulted palate" commonly accompanies idiocy; in this case the palate is narrow, the height of the palatine arch increases at the expense of the nasal cavity, and the space between the bicuspid and molar teeth of opposite sides is decreased. If the narrowness is extreme, the teeth project beyond the upper lip. The lips of an idiot are nearly always thick and everted; the mouth is frequently large and gaping. The teeth generally are irregular and decayed, the saliva often dribbles from the mouth, and the gums are swollen. The skin often exhales a disagreeable odour; the habits are dirty, the passions are strong, the appetite is greedy, and there are frequently brutality and obstinacy.

Cretinism

May be defined as an arrested development of the nervous system and bodily organisation generally, either before or after birth, due to a local cause, such as the condition of the soil, air, water, etc., and marked by characters which distinguish it from a state of mere endemic idiocy.

This condition is found most commonly in shut-up valleys, in which the air is foul, the soil damp, and the inhabitants poor, dirty, and insufficiently or improperly fed. Water derived from lime sources is considered the chief causative agent. It is usually associated with goitre, although not necessarily.

Symptoms.—These generally appear in a marked degree about the sixth month, and are the following: The progress of growth of the body is very tardy; in some cases cretins are puffy, fat, and weak, although apparently healthy. The skin is sometimes of a brown colour, sometimes of an ashy yellow. The head is often big, the fontanelles opened widely, and occasionally the sutures are disjointed, as in hydrocephalus. Cretins appear to open the eyes reluctantly; their look is stupid and languid. The countenance continues always the same, altered neither by fear nor joy. They eat much and eagerly. Much of their time is occupied in sleeping, and they are not awakened with ease. The lips are swollen and thick, and usually gaping. The nose is short and broad. The cry is at times hollow and peculiar, and they seldom weep. The belly is swollen. The limbs are usually feeble and small. The neck is thick and large, and often the seat of goitre. The intellect is dull and apathetic. Dentition is always late in commencement, and generally goes on for several years longer than in the normal child, and is frequently associated with considerable salivation and alarming convulsions. The teeth are often irregular,

blackening, decaying, and falling out. There is seldom ability to stand upright before the second or third year, and walking is scarcely accomplished before the sixth or seventh year. Speech is usually later than walking. After puberty the face of the cretin changes very little, and the cretinous face of fifteen or sixteen years old appears like that of a man or woman of fifty or sixty.

The following differences between the cretin and the idiot must be borne in mind :

1. The idiot is born with deficient development. This affliction is organic and congenital, but the cretin for some time may seem free from disease, and under very favourable conditions may escape entirely.

2. Cretinism is of an endemic character, whereas idiocy is not at all so, but may appear without regard to locality.

3. Cretinism is far more curable than idiocy.

4. The "vaulted palate" is sometimes present in idiots, but in the cretin the yellow or brown colour of the skin, the arched high palate, and the large proportion of cases in which the thyroid gland is enlarged, offer conspicuous points of distinction with the manifestations of ordinary idiocy.

5. In cretinism the muscular and nervous systems are affected in a far greater degree. In idiocy the mental functions may be greatly deficient, out of all proportion to the loss of muscular power and co-ordination.

Treatment.—Much good can be accomplished in the training and education of an idiot. By great patience and experience, he may become somewhat intelligent and his habits well disciplined, as is proved in numerous cases treated at special institutions.

In treating cretins, pure air, abundance of milk, cold and shower baths, and spirituous aromatic solutions applied to the skin are recommended.

Internal remedies are iodide and carbonate of iron and cod-liver oil, sulphate of copper, and oxide and valerianate of zinc.

Galvanism may be employed if there be wasting of the limbs. Great cleanliness and judicious gymnastic exercises are important points of treatment.

Cephalhæmatoma.

This term is applied to a non-pulsating, sanguineous, soft, and fluctuating tumour developed beneath the scalp, the pericranium, or the skull.

It is very rare and intractable when under the skull.

In size the tumour varies from that of a walnut to an apple, and it commonly occurs on one or other parietal bone. It is a common consequence of protracted labour, and usually disappears in a few days by absorption.

If inflammation and suppuration occur, it may be necessary to lay the tumour open, but these events are very rare.

Spirit lotion or the solution of chloride of ammonium may be used.

CHAPTER XXX.

CONTRACTION WITH RIGIDITY—SPASTIC RIGIDITY—CONTRACTURE.

This affection consists in an idiopathic muscular contraction of various flexor muscles of the extremities, especially of the toes and fingers, occurring independently of any appreciable affection of the cerebro-spinal system. It is frequently associated with laryngismus stridulus, and is most common between one and three years of age. It is usually

sympathetic, arising from dentition or gastro-intestinal irritation; but it may be symptomatic of some disease of the brain, as tubercle, or hæmorrhage in the meninges. When the disease is fully manifest, the thumbs are drawn into the palms of the hands, and the fingers, which are powerfully flexed, cover and hide the thumbs. The metacarpo-phalangeal articulations of the fingers are the seat of the flexion, the phalanges themselves being extended and separated from each other. The wrist, forearm, or arms may become the seat of contraction.

The toes are also in a condition of muscular extension or flexion, and the foot is extended upon the leg. The affected parts are generally the seat of stiffness and shooting pains. The mind is clear, though irritability and restlessness are usually present, and strabismus, convulsions, and other nervous indications sometimes, though rarely, occur. Improvement takes place by intermissions, which become of longer and longer duration as the health becomes restored.

The following distinctions between symptomatic and idiopathic or essential contraction should be borne in mind:

In the idiopathic or essential form, cerebral symptoms are not always present, and they never precede the contraction.

The pulse is never irregular.

The contractions are usually intermittent, occurring on both sides, and commencing in the fingers and toes.

In the symptomatic form, cerebral symptoms and functional derangements either precede or accompany the contractions.

Tne pulse is often irregular.

The contractions are generally permanent and partial, and usually commence in the knees and the elbows, and most frequently in a single extremity.

Prognosis is as a rule favourable; and when a fatal result occurs, it usually takes place from convulsions.

Treatment.—This must vary according to the cause, whether due to dentition or gastro-intestinal irritation. The contraction itself may be relieved by warm baths, bromide of potassium, belladonna, or zinc oxide, and the health of the child must be supported by all possible means.

INFANTILE ECLAMPSIA, OR CONVULSIONS.

In the first few years of life, the brain is stated to develop so rapidly that when the second year is completed, after the termination of dentition, its size is doubled. The maximum bulk is nearly reached about the seventh year; but according to some authors it is not completed till the twentieth year.

In early life the cranial bones are thin, the substance is elastic; the same amount of nutrition is not supplied from it to the cerebral vessels as in the adult, and therefore fulness of the vessels is very liable to result from any increase of arterial action, cardiac excitement, or other causes. Since the nervous system is so highly developed, convulsions form one of the most dangerous and frequent of the maladies to which in infant life the nervous system is subject. The mortality from them is higher than that of the great majority of other infantile diseases, and is enormous up to the age of five years, diminishing very considerably after the age of nine.

Male children are more liable to convulsions than female.

Eclampsia consists in a spasmodic action and relaxation of the voluntary muscles, independent of the will, and accompanied by unconsciousness. The term "convulsions" has a wide signification, since they are symptomatic of many

conditions in which the lesions are totally different, as in tetanus, epilepsy, tubercle of the brain, and in chorea.

In delicate infants, deficient supply of blood to the brain may induce convulsions.

Symptoms.—The attack may occur suddenly, or may be preceded by indications of nervous excitability. There may be slight feverishness for a day or two; the child is restless; its sleep is disturbed. The eyes appear heavy, and have a peculiar rolling motion. The wrists are bent, and the thumbs are turned inwards. Convulsions may come on during the course of an eruptive disease, or during dentition, but they may also attack a child in its usual health.

As the seizure threatens, the child screams, and has a vacant expression. There is trembling of the eyeball, which is turned downwards, inwards, or upwards, occasionally concealing the pupil. The condition of the pupils is not uniform. They may be dilated or contracted, or one is dilated and the other contracted.

The countenance becomes hideous and greatly distorted. The jaws close, and there is frothing at the mouth. The muscles of the back and neck are rigid, the head being thrown either to one side or backwards. The feet are inwardly flexed, and the lower extremities thrown into violent agitation.

Causes.—Among the predisposing causes are hereditary nervous susceptibility and dentition. It is probable that in the latter case convulsions are not absolutely caused by dentition; at that period the excitability of the nervous centres is so great that trifling causes, which in adults would lead to hardly any effects, then produce convulsive attacks.

Ricketty children, or those in whom dentition is delayed, are frequently subject to convulsions.

Eclampsia may be associated with struma and chronic

hydrocephalus in cases where the fontanelles are open and the head is large; it is often seen in connexion with laryngismus stridulus.

Convulsions may accompany or follow severe scalp eruptions in children; they are frequently observed in infants at the breast, who are the subjects of diarrhœa and vomiting, and any cause which tends to produce exhaustion may provoke an attack.

Intestinal worms, and diseases of the intestinal canal, are frequently causative; exposure to cold has led to convulsive seizures, and they may arise from blood-poisoning, as in desquamative nephritis with albuminous urine, or may also be caused by burns and scalds.

It is stated that a pin or needle, or a spiculum of bone on the inner plate of the skull, penetrating the cerebral meninges, has led to eclampsia.

Terminations.—Recovery is the usual termination; but when death occurs it is generally from asphyxia, shock, or syncope; in cases where the convulsions rapidly recur, the prognosis is very grave. As the frequency of recurrence diminishes, so does the danger to life lessen; but there is a risk of their becoming habitual. There appears to exist a marked relation between the convulsions of early infancy and the development of epilepsy in subsequent childhood.

Pathology.—The following appearances may be present after death, viz.: Congestion of the brain and its membranes, effusion into the arachnoid, or into the ventricles, often accompanied by congestion of the spinal cord. These are, however, the result of the convulsions, not the cause. An anæmic state of the brain may cause convulsions, and this condition is sometimes present.

Treatment.—The chief point of importance is to ascertain the cause of the seizure. The child should be placed at

once in a warm bath, cold water being simultaneously poured over the face and head. For great distortion of the body during the fit, chloroform may be employed with good results. This substance should be administered when the convulsions are threatening. There is no necessity to anæsthetise the child deeply. If dentition be the cause, and the gums are tense, they should be freely lanced. If irritation of the bowels is present, these parts should be cleared by appropriate remedies. Worms should always be suspected, and remedies suitable for their removal should be exhibited. If the child cannot swallow, an enema should be given in the intervals; to ward off the attacks, the bromides of ammonium and potassium are useful. If there be sleeplessness, a few grains of hydrate of chloral often do good. When the convulsions have ceased, the proper remedies are cod-liver oil and iron preparations, such as the vinum ferri and syrupus ferri hypophosphitis.

CHAPTER XXXI.

DISEASES OF THE SPINAL CORD AND ITS MEMBRANES.

Paraplegia is the most characteristic feature of injury to the spinal cord, as hemiplegia is the prominent symptom of brain lesion; but, whereas in diseases of the brain the intellect and special senses are more or less implicated, in spinal diseases they remain altogether unaffected throughout.

In determining the situation of disease in the cord, it must be borne in mind that—

1. With complete transverse section of the posterior columns of the cord:

   Loss of power results over the regulation of the movements of the parts below the section, accompanied by hyperæsthesia.

2. With transverse section of the anterior lateral column:

   Paralysis of motion is produced in the parts below the section on the same side of the body.

3. (*a*) With transverse section of the whole of the grey nervous matter:

   Sensation is lost only in all parts below the section.

   (*b*) With transverse section of the right half of the grey matter:

   Loss of sensation (anæsthesia) is produced in the left limb below the section, and increased sensibility (hyperæsthesia) in the corresponding limb of the same side as that of the section, and *vice versâ*.

4. With transverse section, therefore, of one entire half of the cord in the parts below the section:

   Paralysis of motion results, with hyperæsthesia on the same side, and anæsthesia only on the opposite side.

5. (*a*) Should inflammation exist in the seat of disease:

   There will be contraction of the paralysed limbs, with rigidity of their muscles.

   (*b*) In the absence of inflammation, or when the inflammation has passed away:

   Flaccidity of the limbs will be observed.

Spinal Irritation.

Symptoms.—There is more or less impairment of motion in the upper or lower extremities, according to the seat of the irritation and to the degree of mischief. There are

languor and obscure pain in the cervical or lumbar region; occasionally the pain is so great as to resemble disease of the vertebræ. There may be some tenderness along the spine, and more or less stiffness of the neck, accompanied by pain in moving the head, may be present. The affection may be the result of masturbation or of severe falls.

The treatment must consist in the application of leeches to the neck, or in cupping the loins; when masturbation is the cause, it may be necessary to blister the penis. The irritation of the spine is almost certain to be removed when the habit is discontinued.

Spinal Hæmorrhage.

A few cases of apoplexy of the spine have been observed. In one case a very firm long clot of blood was discovered external to the cord, and spreading over the entire length of the cervical portion.

The symptoms are paraplegia and those which arise from compression of the cord.

There is severe pain in the neighbourhood of the effusion, with general convulsions, and death rapidly supervenes.

Myelitis.

Definition.—Inflammation of the substance of the cord.

This is a very rare disease; but the grey matter of the cord is the most liable to inflammation, since by it sensitive impressions are transmitted.

Causes.—Myelitis may be caused by violent exertion, exposure to cold and wet, blows and falls, caries of the vertebræ, and concussion of the spine, scrofula, and pyæmia.

Symptoms.—There is a dull aching pain in the affected parts, which are somewhat tender on pressure. Voluntary

motion and sensation are lost, and there is numbness and impairment of sensibility, with feebleness in the upper and lower extremities, or of both, or of a single limb, or there may be loss of voluntary motion in one extremity and of sensation in another. Upon applying a hot sponge or ice over the spine, a burning sensation is produced at the upper limit of the inflammation.

The paralysed parts waste from inaction, reflex action remaining intact. The muscles of the affected member may be convulsed, contracted, or relaxed. Unless the inflammation spreads to the brain, there is no derangement of the intellectual faculties. After a time, incontinence of urine or retention comes on, bed-sores form, and the motions are passed involuntarily, the patient eventually sinking from exhaustion, or dying comatose from the brain becoming attacked. The symptoms vary according to the seat of the disease :

If the *Lumbar* portion be inflamed, the inferior extremities are paralysed, there is retention of urine, followed by incontinence, and constipation succeeded by involuntary evacuation of fæces.

If the *Dorsal* portion be inflamed, continued convulsive movements present themselves, accompanied by palpitations, difficulty of respiration, and a sense of constriction in the abdomen,

If the *Cervical* portion be inflamed there are : paralysis of the superior extremities, dysphagia and dyspnœa, with a sense of tightness in the chest and epigastrium. There is occasionally troublesome priapism.

Sometimes the disease is very insidious in its onset; it advances very slowly, is attended by no pain, and at last is accompanied by paralysis of the rectum, bladder, and inferior extremities.

The prognosis is very unfavourable, and entire recovery

very rare. The disease may become chronic, and last for several years.

Pathology.—On post-mortem examination, the affected tissue usually appears much softened; it is often of a creamy consistence. Small extravasations of blood are sometimes seen; in rare cases an abscess forms. *Microscopically*, broken-down nerve fibres, blood-cells, granules, and pus corpuscles are observed. More or less spinal meningitis is always present. Sometimes the cord becomes indurated from fibrinous exudation.

Chronic Myelitis or White Softening of the cord is sometimes observed, in which the cord is white or of a more or less red or yellowish colour. This may arise from acute myelitis, from gradual pressure upon the substance of the cord from injury, or from failure of nutrition from the vessels becoming degenerated.

Spinal Meningitis.

Definition.—Inflammation of the membranes of the spinal cord.

It is more common in new-born infants, in whom it is regarded as pyæmic.

Causes.—The same as of inflammation of the cord. As in the case of cerebritis and cerebral meningitis, it is very improbable that the brain is affected without the membranes becoming involved, and *vice versâ;* so with myelitis and spinal meningitis, the inflammation is rarely limited to one or the other structure.

Pachy-Meningitis, or acute inflammation of the dura-arachnoid, is very rare; but it has been known to follow damp and cold and injuries, and may arise from disease of the vertebræ spreading to the spinal membranes.

Diphtheria, typhoid fever, small-pox, and occasionally scarlatina have been followed by spinal meningitis.

Symptoms.—There is pain in the affected part, which may be confined to the dorsal and cervical region, increased by percussion, motion, pressure, or heat. The pain is often of a rheumatic character, extending along the back, and to the limbs, and shooting round the chest and abdomen. There may be spasms of the muscles, with subsequent loss of motion and paralysis.

When the disease results from cold or rheumatism, there is a fair prospect of recovery under appropriate treatment; but when the spinal membranes are inflamed from causes other than those just mentioned, there are contractions of the neck, back, and limbs, according to the situation of the disease, giving rise to trismus, torticollis (wry-neck), complete or partial opisthotonos, or even tetanic spasms; there is also a feeling of constriction in the chest, neck, or abdomen, with an urgent sensation of suffocation. The disease is then very rapid in its progress, and is generally fatal from the 10th to the 24th day, with typhoid symptoms, delirium, and coma.

Pathology.—The dura-arachnoid is thickened, its vessels congested, and there is effusion of puriform lymph and serum.

When Lepto-Meningitis, or inflammation of the pia-arachnoid is present, there is an irrregular appearance of the cord, due to effusion of lymph in the arachnoid space.

When caused by disease of the vertebræ, and the structures in their vicinity, the inflammation is localized in portions of the spine; but if due to a general cause it may extend over the whole extent of the spine, selecting the posterior rather than the anterior aspect.

Spina Bifida—Hydrorachis.

This is a congenital malformation, consisting in one or more fluid tumours on the cervical, dorsal or lumbar vertebræ communicating with the spinal cord. The spines, and usually the laminæ of the corresponding vertebræ are wanting. The tumours are of variable size, often transparent, the colour of the skin covering them being normal, livid, or reddish. Pressure upon the tumour produces symptoms of compression of the brain. The bladder and rectum are often paralysed. The limbs are usually imperfectly developed.

In some cases the skin is absent. The tumour is then covered by dura mater, pia mater, and arachnoid membrane. The pia mater is red and congested. Sometimes there is a division of the medulla, which at the seat of the tumour may be entirely absent.

Serous, transparent, blood-stained, or purulent fluid may be found in the sac of the arachnoid. The fluid may communicate with the brain.

Treatment of Spinal Diseases.

In acute inflammation of the spinal cord, the patient must be kept in the recumbent position. The prone position is also very useful. Ice may be constantly applied along the spine ; blistering, or an issue on each side of the spine have been recommended, or even a few leeches.

The value of drug medication is doubtful, but in spinal affections of rheumatic origin, iodide of potassium and colchicum may be employed with advantage.

Belladonna, conium, and ergot are by some considered to act beneficially when the cord is involved.

The bladder and bowels must be especially attended to; the patient kept clean and dry. In chronic affections, bed-sores must be guarded against, in the treatment of which the air-bed or water-bed is very useful.

The general health must be supported by good food, and good hygienic conditions, with tonics, viz.: phosphorus, iron, strychnia, and quinine.

In the treatment of spina bifida, the tumours should be protected by some shield—as cotton-wool, or a well-fitting felt case. Tapping with a fine trocar and gradual emptying of the liquid contents have in some cases proved effectual. Success has also followed tapping of the tumour, followed by injections of iodine solutions, or glycerine with iodine; or excision may be adopted, if it is quite certain that no portions of the spinal cord or nerve trunks are included in the tumour.

Cerebro-Spinal Meningitis.

Children are not infrequently attacked by this malady. It often occurs as an epidemic, but is not contagious, is due to blood-poisoning, resembles typhus, and its mortality is as great as in that fever.

Causes.—These appear to be exposure, fatigue, cold, and bad hygienic conditions.

Symptoms.—The disease begins with rigors and pyrexia, succeeded by great pain in the back of the head, spreading along the spine, and attended by stiffness of the muscles of the neck. Severe vomiting and nausea are usually present. In some cases the intellect remains clear, in others there is stupor, moaning and crying leading to unconsciousness, and the vision is sometimes disordered. The head is flung backwards towards the spine, and the muscles are in a condition of tetanic stiffness; there are paralysis and even

convulsions. The pulse is small and quick; the temperature may rise to 104° Fahr., or even higher. The urine is scanty, the tongue furred. Petechiæ appear upon the neck, face and limbs, disappearing on pressure.

The *Prognosis* is very unfavourable, and the disease may end fatally in a few hours, or may last more than a week.

Pathology.—There is great congestion of the vessels of the brain, with effusion into the ventricles, serous or purulent exudations in the brain membranes, and coagulated blood in the sinuses of the dura mater. The membranes of the cord present similar appearances. The condition is generally that of pia-arachnitis, lymph being found chiefly on the dorsal surface of the pia-mater; it is exceedingly rare to find lymph in the arachnoid space. The spinal cord in this disease is always unaffected.

Treatment.—This is in the highest degree unsatisfactory. Leeches or cupping to the spine may be requisite, or cold applications to the spine and head may be of service. With delirium and high fever, cold may be applied to the shaven scalp, and calomel given every four hours. To relieve pain, hypodermic injection of morphia may be tried, and to quiet the nervous system bromide of potassium and hydrate of chloral may be given. With typhus symptoms stimulants and nutrient enemata may be administered.

CHAPTER XXXII.

DISEASES OF THE EAR.

The internal and middle ear present few points of difference in the child and in the adult, since the structures are early developed. The three little auditory ossicles at birth are almost full grown.

The external bony structures are, however, very dissimilar at birth to what they become in youth and adult age. In the new-born infant there is no positive external bony meatus, but a mere ring of bone.

Thus, in the very young child the membrana tympani is far closer to the surface than in the adult. The plane also of this membrane is almost horizontal, and lies nearly level with the base of the skull.

The external meatus is shut off from the tympanic cavity by the membrana tympani, which is exceedingly vascular, and thus inflammation is easily transmitted from one side of it to the other. Inflammation of the tympanum is very common when cold, damp, or injury have set up inflammation in the external surface of the membrane. The cavity of the tympanum is lined by mucous membrane, and by it communication is effected with the pharynx by the Eustachian tube.

During the act of swallowing, the canal is opened; and during this act, if a little water be swallowed, the rush of air into the tympanic cavities gives rise to two simultaneous clicks, which are rendered more evident if the nose be closed.

It is necessary for the transmission of vibrations with

exactitude, that air should be present on the inner side of the membrana tympani as well as on the outer side of this membrane.

Diseases of the ear may be divided into two *Varieties*—viz., catarrhal deafness and otorrhœa.

Thickening of the mucous membrane of the Eustachian tube, with its subsequent obstruction, may be caused by constant attacks of severe coryza, or of sore throat. Enlargement of the tonsils usually co-exists; a feeling of heaviness in one or both ears is complained of, and decided deafness succeeds. The inflammation spreads from the Eustachian tubes to the cavity of the tympanum, the aural pain becomes constant, and the inflammation may become of an acute character. In consequence of the atmospheric pressure being greater without the tympanum than within this structure, blockage of the Eustachian tube occasions great external concavity of the tympanic membrane.

Catarrhal deafness, then, may be the result of chronic inflammation of the Eustachian tubes, or of inflammatory processes taking place in the tympanum. This deafness often takes place before the occurrence of any discharge from the ear, and the pain begins to subside as the discharge appears.

Purulent inflammation of the mucous membrane of the tympanum, with perforation of the tympanic membrane and escape of fœtid, unhealthy pus by the meatus auditorius externus, is one of the most troublesome affections met with in children.

Otorrhœa, or discharge from the ears, although usually not of a serious nature, may lead sometimes to meningitis, necrosis of the petrous portion of the temporal bone, to facial paralysis, and perhaps to abscess of the brain. It may result also from otitis, or inflammation of the ear.

It sometimes occurs in delicate, strumous children, ap-

pearing as a low form of catarrhal deafness; it is also one of the sequelæ of the eruptive fevers, especially scarlatina, in which case it is the result of otitis of the middle ear; and it may follow other diseases.

Otorrhœa may be easily recognised by the constant purulent or muco-purulent discharge from the external meatus.

The discharge is frequently fœtid, even when no diseased bone is present. The free exit of any morbid fluid from the external meatus nearly always denotes perforation of the tympanic membrane, since an abundant secretion from that passage alone is very uncommon. This perforation is a constant feature of chronic otorrhœa, and of itself is not serious, since it admits of injections into the cavity of the tympanum; and, in fact, perforation is in the direction of safety, since, if the discharge could find no external outlet, it might tend to burrow inwards, and set up meningitis or cerebritis. The most common of the polypoid growths in the ear is the ordinary mucous polypus, and is similar to that which occurs in the uterus and the nose. Aural polypi almost always take origin from the walls of the tympanic cavity. A perforation in the tympanum sometimes may be exceedingly small, resembling a pin-hole, but in some rare cases it is so great that a mere crescentic ridge at the bottom of the meatus externus denotes the situation of the tympanic membrane. A very general symptom of otorrhœa is enlargement of the upper cervical glands. It is always accompanied by more or less deafness; and this symptom may be extreme in a mild case, and sometimes slight even when the ossicles are lost and the greater part of the membrana tympani is destroyed. Complete deafness almost invariably follows the falling out of the stapes. In order to determine the amount of mischief, it is necessary to syringe the ear with warm water, cleaning the

meatus by a piece of wool wrapped round a quill pen. This operation is requisite, since the discharge prevents the deeper parts of the meatus being seen. Generally the membrana tympani can be seen, very vascular, and presenting a minute perforation; but occasionally, when the membrane is destroyed, the cavity of the tympanum can be observed clearly through the speculum, the promontory being coated with brilliant red granulations, and the malleus standing out boldly. In some cases the perforation is so small that at first it cannot be detected; but if during the inspection the patient be asked to make a forcible expiration with the nose and mouth closed firmly, then the discharge can be observed coming through the opening. The presence of minute perforations, which are invisible at first sight, may be suspected by the existence of a pulsating motion in the thin layer of fluid by which the outer side of the membrana tympani is covered.

Treatment.—When the mucous membrane of the ear is involved, the local and general measures which are beneficial in coryza and tonsillitis will be necessary, viz.: weak astringent applications, cod-liver oil, and tonics; the morbid collections must be removed daily, the ear being syringed several times a day with tepid water. When there is fœtor, a little carbolic acid may be added to the water (1 in 40 or 1 in 50). A few drops of a weak astringent solution may be poured into the ear, such as sulphate of zinc gr. i.-v., with borax gr. v.-x., glycerine ʒi., and water ʒi. After checking the discharge, the edges of the perforation may be touched through a speculum with solid nitrate of silver. An artificial membrane may be worn if the membrana tympani is much destroyed. A plug of wool moistened with glycerine and sulphate of zinc often proves effectual.

Otorrhœa may be cured in a few months by careful treatment, but it is liable to recur frequently in children.

Eczema of the Auricle.

This is a very common affection in infancy. It causes great irritation, and is very disfiguring. It may be caused by otorrhœa, by the use of coarse soap or by dirt, and it is frequently accompanied by eczema of the head; but it may arise from derangements of the constitution.

The local treatment should consist in the application of the saccharated solution of lime and glycerine in equal parts, or vaseline. In cases of constitutional disturbance, alteratives must be given, followed by tonics.

Aural Abscess

May arise from debility, or from the presence of dirty wool in the meatus, or by the abuse of injections.

The ear should never be washed out with water, and dried by forcing the corner of a towel into it. Ear-ache, inflammation of the internal auditory meatus, or blocking of the passage by collections of cerumen, may be occasioned by the above practice. By nature the meatus is dry, the cerumen falls off as a fine powder, and if it be moistened it concretes into a thick mass.

The treatment must consist of warm fomentations, constitutional remedies, and early incision.

Ear-ache, or True Aural Neuralgia,

Is characterised by extreme pain, but it is unaccompanied by febrile symptoms, appears suddenly, and disappears as suddenly; and it does not increase in intensity, as is the case with inflammation of the ear.

It must be treated with moderate purgation, and a little oil and tincture of opium, or a drop or two of chloroform on cotton-wool may be placed in the ear.

CHAPTER XXXIII.

DISEASES AND CONGENITAL AFFECTIONS OF THE NEW BORN.

Ophthalmia Neonatorum.

This affection generally appears within the first few days of birth. The eyelids are found agglutinated, red and swollen; on raising the lids, the conjunctivæ appear inflamed, and coated by a transparent sticky substance. Purulent matter forms the agglutination, and the swelling increases. Intolerance of light (photophobia) is intense. Haziness of the cornea may take place, and purulent infiltration, ulceration, and prolapse of the iris sometimes follow, leading to destruction of sight. Complete opacity from interstitial deposit in the whole or part of the cornea is not infrequent, a thin film being formed over the corneal surface.

Causes.—These are exposure to too strong a light, irritating substances dropped into the eye, as soap, etc.; and defective conditions of hygiene, especially those resulting from puerperal fever. Leucorrhœa and gonorrhœa in the mother are special causes. There is a dangerous tendency to overlook this affection in its early stages. What is assigned to merely a "little cold," may be neglected until its urgent nature becomes only too manifest. The swelling of the

eyelids in the ophthalmia of infants is greater than in that of adults; the lids stand out like lumps, the upper lid being frequently pushed down over the under. The lids are pressed together so tightly by the swelling that it is difficult to open them. The swelling of the conjunctivæ also is more severe than in the adult; it is loosened and elevated by serous effusion in the areolar tissue beneath the conjunctiva. From eight to ten days from its first appearance, at which period the ocular chemosis is most severe, the cornea becomes hazy in spots, or a universal haziness with red edges appears on the surface. The ulceration, abscess, or slough which succeeds is generally central.

The lens in infants is more liable to escape through the breach in the cornea than in adults. In the former, with much loss of the cornea the lens is almost invariably expelled.

Cases which arise from gonorrhœa are the most serious, and the longer the case is neglected or left untreated the more will it prove intractable. According to the early implication of the cornea so is the gravity of the case, and the amount of palpebral œdema is usually in proportion to the serious nature of the affection. So long as the cornea remains clear, it is possible to save the eye; but if any haziness appears, some permanent mischief will probably be established. If the ulceration is superficial and interstitial, suppuration is absent; a small opaque speck only may be left. This is of little consequence if it is not within the area of the pupil; if, however, the ulceration is deep, the opacity will be extensive.

Even in cases where the cornea has been little damaged, impairment of the sight may result through injury to the choroid and retina. Opacity of the cornea which has resulted from simple thickening of the conjunctiva may disappear after a time; but when it results from ulceration, it is

permanent, and the sight is interfered with in proportion to its extent.

Treatment.—To prevent struggling the child should be wrapped in a shawl, with the arms close to the side. The discharge should be removed by small pieces of soft rag or sponge, which should be burned directly after using—the cleansing being completed by careful syringing with tepid water under both lids. A solution of alum (6 to 10 grains to an ounce of water) should then be injected and thoroughly diffused over the cornea. After drying the lids by dabbing them with soft rag, and to prevent their agglutination, some spermaceti ointment should be smeared along their edges. The above process must be performed at first every two or three hours, and subsequently four to six times a day. The following treatment has also been advocated, viz., a mixture of 2 parts of nitrate of potash to 1 part of nitrate of silver melted and poured into an iron mould. The eyelids should be reversed one after the other, and when carefully cleansed, touched with the above caustic, which should be applied to the red and swollen parts. A drop of salt water should be added to the free nitrate of silver before the lids are replaced. One application a day will suffice, and after improvement takes place it may be made once every two or three days. If ulceration is to be feared, a drop or two of liquor atropiæ may be dropped into the eye to relieve inflammation and to dilate the pupil. Occasionally after the disappearance of inflammatory symptoms, the conjunctiva remains thickened and relaxed, presenting a condition known as *granular conjunctiva;* for the relief of this a collyrium of vinum opii may be employed.

Asphyxia Neonatorum.

This is a condition in which the child at birth does not breathe. The pulsations of the heart show that the child is alive, but there is no action of the muscles of inspiration. It should more properly be termed "Apnœa."

Causes.—Long-protracted labour, the cord being wound round the infant's neck; great compression of the cord; the mouth and fauces being clogged with viscid mucus; extreme debility of the infant.

Treatment.—The mouth and throat should be cleansed and the buttocks slapped. Alternate heat and cold should be employed, especially with friction. The infant should be placed in a warm bath, a dash of cold water being used immediately, and the child again placed in the warm bath. As soon as respiration begins the child should be taken from the bath. Silvester's mode of artificial respiration is a valuable aid. In extreme cases electricity may be employed. The cord should not be cut too soon, unless the case is of a congestive, cyanotic, or apoplectic origin, in which case blood to the extent of a tablespoonful may with benefit be allowed to flow previously to tying the cord. It is possible for an infant to remain an hour or more without breathing and yet be saved.

Sclerema—Edème Algide.

This term implies an induration and swelling of the cellular tissue, either with or without œdema. It is a very rare disease, and is nearly exclusively confined to the first few weeks of life. It generally begins in the calves or the feet, occasionally in the region of the pubes, and extends over the greater portion of the body, with the exception of the thorax. The affected parts are hard, the skin is tense, so

that it is incapable of being moved or pinched up from the subjacent parts.

The skin may vary in colour from a yellowish to a purple tint, and to the touch it is cold, harsh, and dry.

It is stated that the thermometer sinks in the mouth sometimes to 71° or 72° Fahr., and in very rare cases even to 70° Fahr. The breathing is slow, the cry weak, and sucking is performed feebly. The pulse sinks to sixty beats in the minute. In fact there is depression of every vital function. The sensibility of the skin is generally lost.

In course of time cough appears, indicating the presence of atelectasis pulmonum, or of lobular or catarrhal pneumonia. The former of these affections by some is regarded as causative of sclerema, and no doubt the affections are frequently associated.

In some cases there has been no loss of skin sensibility; there is usually power to move the affected parts. In all probability sclerema appears under two distinct varieties, one consequent upon induration of the adipose tissue, the other upon serous infiltration of the cellular tissue.

The general indications are a shrill, sharp, frequently-repeated cry, constipation, difficulty in swallowing, convulsions, and gradually increasing stupor. Death generally takes place within four days, but it may be later. In favourable cases the eyelids and fore-arms are the parts which first become flaccid. The legs and feet remain œdematous the longest. The discolouration of the affected parts remains after the swelling has gone, the skin for some time being flabby and wrinkled.

Treatment.—The most important measures are warm, hot, or vapour baths, and friction to the skin; stimulants, as white-wine whey, may be administered. If the child cannot take the milk, this fluid should be milked out of the breast and given with a spoon. Possibly puncturing to relieve the

tenseness, and to allow the escape of the accumulated serum, might be beneficial.

Swelling of the Breasts

Is not an uncommon affection in infants of either sex. About the second or third day after birth there may be painful swelling of both breasts.

All that is necessary is to apply a warm fomentation or a bread-and-water poultice sprinkled with a little vinum opii. The practice of squeezing and pressing these swellings cannot be too strongly condemned, since the proceeding may lead to inflammation followed by abscess.

Diseases of the Navel.

The detachment of the navel is generally complete within five days, and those cords come off the soonest which are thin and dry, and in which less gelatinous Whartonian matter is contained. If the navel separates favourably there is only a slight serous oozing, and the scar is healed by the end of fourteen days.

In some cases, however, inflammation may occur, and sero-purulent matter is discharged, erysipelas of the surrounding structures resulting.

Hæmorrhage from the navel is a rather serious occurrence. It is happily rare. It may take place from within a few hours to the fourteenth or fifteenth day after birth, and generally occurs on the eighth day.

Jaundice not uncommonly precedes this hæmorrhage.

The blood generally coagulates very slowly, and occurs as a continuous oozing, not as a stream.

A hæmorrhagic diathesis underlies this condition, which is frequently accompanied by constipation and disease of the liver.

Treatment.—For slight inflammation or ulceration, care must be bestowed upon cleanliness; a little diluted lead lotion, or zinc ointment and vaseline, may be used. An occasional application of nitrate of silver will be serviceable in cases where the character of the wound is indolent; other applications are carbolic acid lotion, and Condy's fluid.

The infant should be carefully suckled, a very little wine or brandy in milk being added to its dietary.

For arresting hæmorrhage from the navel, collodion and plaster of Paris are the dressings most likely to prove effectual; ordinary styptics are of little use.

Internally, in some cases, the mineral acids and other astringents are said to confer marked benefit, whilst in others free purgation followed by astringents has been of service.

In addition to the diseases above described must be mentioned, Atelectasis Pulmonum, Cephalhæmatoma, Trismus, Cyanosis, Icterus, and Hydrorachis; but these affections have been described under headings to which they appear more appropriately to belong.

CHAPTER XXXIV.

THE FEVERS.

Pyrexia.—Simple Fever.

The following *Symptoms* are common to most febrile conditions, viz.: a quick pulse, thirst, increased heat of skin, anorexia, confined bowels, scanty high-coloured urine, debility, general restlessness, and sleeplessness.

Simple fever is characterised by three well-marked stages, viz.:

1. The *Initial* or *Pyrogenetic Stage:* this usually commences with a shivering-fit, in which, although the child complains of feeling cold, the temperature is high.
2. The *Acme* or *Fastigium:* in this the highest average temperature of the disease is reached.
3. The *Stage of Decrement*, or *Period of Critical Perturbation*, succeeded by a Period of *Defervescence* or cooling down; if this is *slow*—occupying several days—it is termed a *Lysis;* if it is *sudden*, it is called a *Crisis.*

In nearly all inflammations the symptoms of fever are present; it is, therefore, highly important to examine the state of the chief organs to ascertain if there is any local cause to account for the presence of these symptoms. Very acute febrile manifestations may arise in children from mere gastric derangement, or from the irritation of teething; on the other hand, every fever may give rise to local disturbances, and therefore it must not be concluded because

some organ is affected that it has of necessity occasioned the fever.

When no local cause exists, the fever is termed *Primary*, *Idiopathic*, or *Essential*.

When it is dependent upon some local cause, it is termed Symptomatic, or Secondary.

Fevers are also named according to the organ or system affected, viz.: *Mucous*, *Gastric*, *Nervous*, when the distinction is not very clear between the essential and symptomatic forms.

Fever with great prostration is termed *Adynamic*.

When symptoms referable to the nervous system appear, such as delirium, the fever is termed *Ataxic;* if there is a tendency to a fatal result, it is termed *Malignant*.

When there is an accumulation of blood in the vessels of the internal organs, the fever is called *Congestive*.

Temperatures.

The thermometer having been previously warmed in the hand, the bulb should be placed in the axilla for about five minutes. Temperatures should be taken twice a day. The best times are from seven to nine o'clock in the morning, and from five to seven o'clock in the evening. The normal temperature of the axilla is 98·6° Fahr., and any signal deviation from this, either above 99° Fahr., or below 97° Fahr., indicates ill-health.

Rules concerning Temperatures.

The following points should be remembered:

1. A very high or very low temperature must be looked upon as dangerous; should it be excessive either way, the case will probably prove fatal.

2. A very sudden change is suspicious, and very frequently dangerous.

   In children, however, the presence of indigestible food in the intestinal canal may suffice to cause a rapid rise in the temperature.

3. After the temperature has been stationary for some time, or has commenced to fall, a fresh rise may herald the advent of some complication, or the approach of a new disease.

4. An unexpected fall may denote hæmorrhage, exhausting diarrhœa, or the perforation of the peritoneum or pleura.

5. A considerable rise during the course of a disease which is not generally regarded as febrile—viz., in tetanus, epilepsy, and chorea—usually precedes death.

The *Incubation Stage* is the period between the exposure to the infection and the onset of the fever; its duration differs in different fevers.

The *Febrile Stage* represents the first appearance of the illness; it is terminated by the eruption, which is then known as the *Eruptive Stage.*

Fevers, as they occur in children, may be divided into the following groups, viz.: 1, the Continued; 2, the Malarial; 3, the Eruptive Fevers.

The last—viz., the eruptive fevers—properly belong to the exanthemata, but they may be conveniently described under this head.

The Continued Fevers.

Under this heading are included:

1. Simple continued Fever or Febricula.
2. Typhus Fever.
3. Typhoid, Enteric, or Pythogenic Fever.

Febricula or Feverishness—Simple Continued Fever.

This fever is termed *continued*, since it pursues its course without any well-marked remission.

The prominent *symptoms* are: Headache; a full, rapid pulse; sickness, a white-coated tongue, anorexia, and thirst; the skin is hot and dry, the bowels are confined, there are pains in the back and limbs, with general languor and debility. The urine is scanty (due to deficiency of water), and the urea and the uric acid are usually increased. The fever is of a mild character, and generally runs its course in twenty-four hours, or only lasts for a few days. In its mildest form it is usually caused by fatigue or exposure to a hot sun, or by prolonged study in a close room. Many cases occur in the summer season, the weather having changed suddenly, and become hot and relaxing. Feverishness may also result from indigestion, dentition, or worms in the intestinal canal. Febricula is not characterised by the existence of any particular symptom, but by the co-existence of various symptoms. It is dependent upon a variety of causes, is not specific, and presents nothing definite, as is the case with fevers which originate from contagion, and in which the normal proportion of the blood constituents is altered. The temperature, even from trivial causes of irritation, may reach 105° Fahr. in the evening, and fall to normal on the following morning. There is no eruption, and the attack is usually terminated by sweating.

General Treatment of Fevers.

In all cases there is a tendency to run a certain course, and to end naturally in the re-establishment of health.

There are, however, in these, as in the management of all diseases, certain indications of treatment. Thus, in fevers these are:

1. To diminish the arterial excitement.
2. To support the powers of the system.
3. To obviate congestion and local inflammations.
4. To bring down the temperature when it tends to hyperpyrexia.
5. To alleviate urgent symptoms.

To attempt to *cure* a fever is a manifest absurdity; all that can be done is to guide the child safely through the danger—in fact, to act as the pilot in the storm, applying judicious measures to meet each complication.

In the *Treatment* of febricula, however, cooling drinks should be given, milk and seltzer-water being the exclusive nutriment. The temperature may be brought down, and convalescence established by the administration of a few grains of rhubarb and grey powder. In some cases an emetic is of great service. At the decline of the fever quinine is a very valuable remedy.

CHAPTER XXXV.

THE CONTINUED FEVERS.

Typhus Fever.

An attack of typhus is generally rather sudden, commencing with languor, chilliness, occasionally marked rigors, giddiness, vomiting, and pains in the head and limbs.

Loss of muscular power is very marked and early.

When the disease is fully established, the child lies on the back in a state of low, muttering delirium or semi-consciousness. The cheeks are uniformly flushed, and of a dusky, dingy hue. Sordes form upon the lips. The tongue is dry, and coated with thick brown fur; there are loss of appetite and thirst, and heavy, persistent headache; but diarrhœa is usually absent, and if present is only slight in quantity, the evacuations being acid, non-albuminous, and not of an ochry colour as in typhoid fever; the pulse is feeble and rapid, the respirations are increased in number, and the skin is hot. The pulse in children frequently reaches 140 or 150 per minute. A sudden fall in the pulse frequently indicates a fatal issue, or the approach of some serious complication; and if the latter, it again rises rapidly.

The average temperature varies from 102° to 107° Fahr. It generally rises suddenly at the onset, but, although it is highest in the evening, the difference between the morning and evening temperatures is not so marked as in typhoid fever. The urine is said to be deficient in chlorides. With the advance of the disease there is increasing stupor, and the pupils are contracted to a pin's point (the pin-hole pupil of Graves); increased dulness in the splenic region may be found. An attack of typhus is usually milder in children than in adults.

Period of Incubation.—The average duration, according to Murchison, is about twelve days.

Day of the Appearance of the Rash.—From the fifth to the seventh day of the illness.

Character of the Eruption.—A number of spots of a dull or dark red colour, usually appearing first on the trunk, and well developed upon the chest and front of the shoulders. The spots resemble mulberry stains, are usually abundant, and rapidly become persistent—*i.e.*, not disappearing under pressure. They are *maculated*, and not slightly papular as in typhoid. The maculæ in children are less distinct and fewer than in adults; but the subcuticular mottling, or irregular dusky-red appearance of the skin, in the former is more general. In children, again, the whole body is often covered as in measles, and in some rare cases the rash may be absent; no desquamation of the skin follows.

The critical stage is at about the end of the second week, or, in more severe cases, at the commencement of the third week.

In favourable cases the decline of the fever is often very sudden, forming a *crisis*, and the turning-point is usually about the fourteenth day.

Complications.—Typhus is very commonly complicated with pneumonia, bronchitis, or pleurisy, and occasionally with convulsions. Albuminuria, sudamina, boils, erysipelas, gangrene, and sloughing are common. Bed-sores and mortification of the toes are apt to form, and sometimes inflammation, followed by suppuration of the parotid gland, occurs.

Causes (*Predisposing*).—The causes of typhus are filth, overcrowding, imperfect ventilation, insufficient food, and unhygienic conditions generally.

The *Exciting* are: a *Specific Poison* which is generated in the bodies of persons suffering from prolonged want of food,

and at the same time exposed to organic exhalations; and *Infection* by the poison thus generated.

Typhus is the most contagious and infectious of all the fevers, and occurs as an epidemic. The poison is contained in the exhalations from the lungs and skin of the patient, and is probably introduced by the lungs into the system of another person. The mortality in children under ten years of age is about 5 per cent.; between ten and twenty years it is 20 per cent., increasing with each decade.

Pathology.—The blood is very dark and fluid, the bile dark and thick like treacle, the muscles are dark and easily torn, and the cerebral membranes sometimes gorged with blood. The heart tissues especially are soft and flabby, and frequently in a condition of fatty degeneration. There is sometimes a passive effusion of serum between the brain-membranes. The kidneys are often congested. The liver and spleen may be congested, pulpy, and softened.

Disinfection and Prophylaxis.—The exhalations of the patient should be carefully avoided; free ventilation must be ensured; and lumps of charcoal should be distributed about the room. All articles of clothing should be exposed to the action of boiling water or steam, and afterwards rinsed with a saturated solution of permanganate of potash or other disinfectant, as carbolic acid. The mattresses should be baked.

Treatment.—The child should be placed in a cool, well-ventilated room in which a brisk fire is kept burning. If the skin be pungently hot, he may be immersed in a warm bath for five minutes, or tepid sponging may be employed. Ice may be applied to the head, and if the brain symptoms are severe the head should be shaved; or for the relief of the headache the cold douche may be applied, or blisters to the forehead. The bowels may be opened by suitable aperients.

The great danger is the extreme exhaustion, to counteract which good nursing is indispensable.

The diet should consist of eggs, milk, beef-tea, and tea and coffee. Alcoholic stimulants are especially valuable, brandy being the best, which may be mixed with iced water and given every one or two hours. Ammonia with decoction of cinchona is very useful, and quinine and acid may be given during convalescence. The formation of bed-sores should be carefully watched. The chest complications must be treated according to the symptoms.

Typhoid, Enteric, Pythogenic, or Infantile Remittent Fever.

An attack of typhoid is generally insidious, and may continue for some time undetected; it may commence with chilliness, loss of appetite, and slight pyrexia, sometimes accompanied by convulsions, nausea, and slight diarrhœa, and sometimes not; in fact, constipation is occasionally a marked symptom at this period. When fully established, evidences of gastro-intestinal irritation are always present, viz, a glazed tongue, red at the tip and edges, sometimes dry and fissured; the pulse is small and rapid, the face pinched and pale, and the cheeks marked with a circumscribed hectic flush. The child rapidly loses flesh, and becomes much wasted. After a time the lips become cracked, and sordes may form upon the teeth. Diarrhœa probably now sets in, the stools being watery, pultaceous, alkaline, albuminous, and ochre-coloured (the pea-soup stools), and there is tenderness and gurgling on pressure over the right iliac fossa, and a blown condition of the abdomen. Brain symptoms are not so marked as in typhus, although delirium may be present, and sometimes of so violent a nature that the disease has been mistaken for cere-

britis. The disease is rare in children under five years of age.

Period of Incubation.—About ten to fourteen days.

Day of Appearance of the Rash.—From the seventh to the twelfth day of the illness.

Character of the Eruption.—A few rose-coloured lenticular spots, chiefly confined to the abdomen and chest. They are slightly *papular* and non-persistent (disappearing for a moment on pressure). Their number varies considerably, from two to thirty or forty, but in most cases the spots are few. They begin to fade ahout forty-eight hours after their appearance, new ones arising, these being in their turn succeeded by another crop.

In some cases there is no eruption, and when there is, the abundance of the rash bears no relation to the severity of the disease.

In the second week of the disease and after, hæmorrhage may occur from the bowels. Death may result without discharge of blood from the anus, and in this case, after death, the intestines will be found filled with blood, or the hæmorrhage may occur at intervals, the patient becoming pallid and much prostrated. Perforation of the intestines is to be dreaded if the purging becomes frequent and persistent, tenderness and tympanites arising, and if vomiting and hiccough supervene.

The rise of temperature is very gradual during the first week, the evening temperature being often two degrees higher than that in the morning, and the next morning temperature being one degree less than that of the previous evening.

There is no increase of the evening temperature at the end of the first week, but still that of the evening is greater than that of the morning.

There is only a slight remission in the second week.

There is often an increase of temperature at the com-

mencement of the third week, and if the case should improve, there is a very notable difference between the morning and evening temperatures.

This frequent occurrence of increase of pyrexia towards night with remission in the morning is common to all the febrile conditions of children ; but in typhoid it takes place sufficiently often to have received the name of infantile remittent fever.

In a favourable case, the fall of the temperature is gradual.

A mild case may terminate in twenty-one days ; but a severe one may last some weeks, about six weeks being the extreme time.

There is always disease in the lower part of the ileum.

The great danger is when the patient is recovering, either from hæmorrhage from the bowels or perforation of the intestines.

Recovery is always slow, and the digestive system remains feeble and irritable for some time.

Complications.—Bronchitis, pneumonia, and pleurisy are very common. Parotitis, followed by suppuration, sometimes occurs, but not so frequently as in typhus. If the child is of a tuberculous habit, active tubercular deposition is frequently excited by an attack of typhoid.

Sequelæ.—Hæmorrhage, peritonitis, and perforation are natural results of the disease.

Hæmorrhage may result from the intestinal ulcers eroding a small vessel.

The ulcers may extend through the intestinal coats and induce peritonitis, which may become general.

Perforation takes place if the peritoneal coat becomes extremely thin.

Marasmus is exceedingly likely to follow, since the mesenteric glands are always extensively involved.

Causes.—Emanations from putrid and decayed animal matter. These may be conveyed by the air, or by water tainted by sewage, or by stagnant pools which have been the receptacle of dead animals and sewage.

Some attribute the disease to a *specific poison* contained in the *alvine secretions* of persons suffering from typhoid fever.

Enteric fever is prevalent all over the world; much doubt exists as to its infectious nature, and it is not usually regarded as contagious. The autumn season may predispose to the affection, but conditions of life do not appear to exercise any remarkable influence.

Pathology.—Typhoid is no doubt due to a blood poison. The local manifestations of the disease are chiefly observed in the solitary and agminated glands (Peyer's patches) of the lower third of the ileum, near the ileo-cæcal valve. These normally obscure glands are first swollen and elevated, pale, soft and rounded at the margins. They rapidly become vascular, the swollen gland becomes abraded, and sloughing and ulceration soon succeed. A whole Peyer's patch may be coated with a discoloured aphthous-looking slough. When the ulcer has advanced, or after the separation of the slough, the surface is rugged and granular.

The edges of the ulcers are raised and hard; internally they are ragged with excavations, and externally they are smooth and rounded. As the base of the ulcer approaches the peritoneum, the inflammation of that membrane increases; when the ulcers are numerous, the patches become confluent, and the outer surface may be covered with plastic lymph. If this covering becomes the seat of ulceration perforation must ensue, but it is often temporarily delayed by the adhesion of sloughy tissue within the membrane itself, or by the formation of solid lymph upon its external surface.

In cases of recovery, the ulcers heal, contract, cicatrise,

and eventually form a depressed smooth surface, which is less vascular and thinner than the surrounding coat.

The mesenteric glands are always much swollen, and more or less inflamed. The spleen is softened and enlarged, sometimes containing little yellowish-white deposits, similar to those found in the diseased glands of the intestines.

The bile is thin and almost colourless.

Disinfection and Prophylaxis.—Drains should be cleared and flushed, and any offensive accumulations removed. Any tainted water should be filtered through charcoal, and boiled before use. The dejections of the patient should be mixed with disinfecting solutions.

Treatment.—The child should be placed under the same hygienic conditions as have been mentioned in the treatment of typhus. The early constipation, which is sometimes a marked symptom, may be combated with castor oil, and acetate of ammonia and camphor mixture may be given. A few leeches may be applied to the abdomen if there be great heat and tenderness over this region, or a large warm poultice may be placed over the whole abdomen, and good results may attend the use of counter-irritants, as blisters, or acetum cantharidis, and warm turpentine. For regulating the secretions and checking inflammation of the intestinal glands, two or three grains of hydrargyrum cum creta, with as many grains of pulvis ipecacuanhæ compositus, may be administered.

If the diarrhœa be profuse, chalk mixture may prove efficacious, cautiously combined with a small dose of tincture of opium, according to the age of the child ; or pulvis kino compositus, or pulvis cretæ compositus cum opio may be given.

A very efficient remedy is the acetate of lead in small doses, or this drug may be given as an enema with solution of starch and tincture of opium.

For the first few days the diet should consist of toast and water and weak beef-tea. Wine should be cautiously administered as the disease advances, but if the diarrhœa be copious and exhausting, stimulants may be freely exhibited. Great care must be exercised in the choice of aliments even after the worst symptoms have subsided, since the slightest dietetic error may cause a serious relapse. Solid food should not be given until the stools have become solid, and the temperature has remained normal for at least fourteen days.

Typhus Fever contrasted with Typhoid Fever.

From careful consideration of the foregoing statements, it will be observed that *Typhus Fever* is distinguished by its very contagious nature, by the greater prevalence of cerebral symptoms, by the presence of the persistent dark mulberry rash, and by the absence of disease of Peyer's patches. It is recognised in its early stage without much difficulty. There is the rapid, rather full pulse at first, the thick brown tongue, great thirst, and more or less delirium. The bowels are usually confined; if opened, the stools are acid and non-albuminous, and after a few days there is the characteristic mulberry rash.

In typhus, the temperature rises far more suddenly than in typhoid, and may vary from 102° to 107° Fahr. on the first day of the illness; it also pursues a totally different course to that of typhoid.

The mortality of typhus is higher than that of typhoid.

Typhoid Fever, on the other hand, is characterised by its non-contagious nature, by the less definite cerebral symptoms, by the thin, dry, glazed tongue, by the presence of the light rose-coloured non-persistent rash, by the blown condition of the abdomen, by the more or less severe diarrhœa, and by the existence of disease of Peyer's glands.

The early symptoms are by no means so well marked as in typhus, and are often difficult to recognise, the disease sometimes creeping on very insidiously. There is less tendency to delirium, the progress of the disease is less rapid, the danger of collapse not so imminent, and the abdominal symptoms far more evident.

For the first three days of typhoid, there is a steady increase of temperature, at the end of which period the temperature generally rises to 103° Fahr., and pursues a peculiar course, as already described.

Malarial Fever.

Although this affection is rare amongst children in this country, it is not uncommon in children residing abroad, in whom it exhibits peculiarities which often lead to its true nature being overlooked.

Cases of malaria contracted in utero are upon record; the infants at birth having shown unmistakable signs of the disease. Even from the age of a few weeks upwards, children may contract the disease if exposed to malarial influences. In children over five or six years of age, the malarial symptoms may be almost the same as in adults; the following statements, therefore, apply chiefly to the younger subjects.

Symptoms.—Both *acute* and *chronic* forms of malaria are observed in children. The acute form may occur in a remittent and intermittent type.

Intermittent fever may occur in any of the varieties seen in adults; but the most frequent form is the quotidian.

The tertian is less frequent, and the quartan very rare. In any case, it shows many peculiarities. The phenomena may be imperfectly developed. The *cold stage* is seldom well marked; it may even be absent entirely; mere pallor

and weakness may be present, or there may be distinct coldness of the extremities and blueness of the nails. This stage may last only for a few minutes to a quarter of an hour. Then follows the *hot stage*, or a state of feverishness, which may be ushered in by delirium or by a convulsion. The substitution of a convulsion for the chill as the initiatory indication of the malarial paroxysm must not be overlooked, but regarded as of diagnostic importance. The duration of the fever is very variable, and it seldom ends abruptly, as in adults, by profuse sweating. The accession of fever takes place at very irregular hours. The child may vomit at the time of the attack. During the paroxysm, any urine passed is high-coloured and scanty; but soon after the fever has subsided there may be a copious discharge of limpid urine. The most frequent complications are pneumonia and bronchitis.

Chronic Malaria appears in children in a similar way as in adults. There may be no well-marked paroxysm, but there is the characteristic sallow, cachectic or anæmic appearance, emaciation, poor capricious appetite. The spleen frequently becomes enlarged, and the so-called "ague-cake" has been observed even in very young children. In very severe and prolonged instances granular kidney, albuminuria, and uræmia have followed. The various forms of neuralgia, which in adults are so commonly of malarial origin, are never observed in children.

It is very probable that in children the existence of malarial disease is not recognised, chiefly by reason of the imperfect development and irregularity of the paroxysms; but in all cases of irregular febrile action, especially during the spring or autumn, in the absence of any accountable cause, the true nature should be suspected. Full doses of quinine continued for several succeeding days may clear up the doubt.

Treatment.—All forms of malarial fever readily yield to specific treatment. Even very young children bear quinine in full doses. It may be necessary to give 3 grains of quinine to a child of one year, and perhaps an additional grain for each succeeding year; and 5 grains have been given to a child of ten months old during the course of the day without any ill effects.

The action of the quinine should be kept up for some time after the paroxysms are broken, since their tendency to recur is considerable. At the same time, iron and arsenical preparations should be administered.

In the chronic form of malaria, quinine, arsenic, and iron should be persevered with for some considerable time. The best hygienic conditions should be ensured, and the child, if possible, removed from the malarial source.

CHAPTER XXXVI.

THE ERUPTIVE FEVERS.

Exanthemata.

1. Morbilli, Rubeola, or Measles.
2. Rubeola Notha, Rötheln, or German Measles.
3. Scarlatina, or Scarlet Fever.
4. Vaccinia, or Cow-pox.
5. Variola, or Small-pox.
6. Varicella, or Chicken-pox.

Morbilli—Rubeola—The Measles.

Definition.—An infectious and contagious fever, especially characterised by catarrhal symptoms, and by a peculiar eruption.

Varieties.—1. Rubeola vulgaris, simplex, or mitis. 2. Rubeola maligna. 3. Rubeola sine catarrho.

Causes.—Predisposing.—Infancy and childhood.

Measles may, however, occur at any age.

Exciting.—Specific contagion, to which, however, the susceptibility usually occurs only once in a lifetime.

Symptoms.—The preceding symptoms are coryza and catarrh, accompanied by general pyrexia. There is running at the eyes and nose, hoarseness, difficulty of breathing, frequent sneezing, nausea and vomiting, and furred tongue. Bleeding from the nose (epistaxis) is sometimes a prominent symptom, and in children the affection is often ushered in by convulsions. The early symptoms closely resemble an attack of influenza.

Period of Incubation.—From ten to fourteen days.

Day of Appearance of the Rash.—About the fourth day.

Character of the Rash.—An eruption of raised red spots, which coalesce to form brownish-red crescentic patches (compared to a shrimp's tail), appearing first on the face and neck (occupying from thirty-six to forty-eight hours in its full development), disappearing about the third or fourth day after its appearance, and followed by *slight branny desquamation* of the cuticle. The temperature on the first or second day of the eruption may rise to 106° or 109° Fahr., but the average temperature is 103° Fahr.

Duration.—From ten to fourteen days.

Measles is usually a mild and often slight disease, but in a few instances it may be followed by serious sequelæ. The chief source of danger is the liability to complications, such as rheumatism, bronchitis, or pneumonia; and if these affections can be successfully combated, recovery is nearly certain.

In fatal cases pneumonia and capillary bronchitis are the most frequent causes of death.

In the Malignant form the eruption is dark purple, the

pulse is rapid and feeble, the tongue brown, and the patient likely to sink from exhaustion.

Rubeola sine catarrho is a variety of measles in which affections of the Schneiderian membrane, larynx, and bronchial tubes are wanting.

Sequelæ.—Pulmonary œdema, pneumonia, diphtheria, bronchitis, and phthisis may follow an attack. Measles appear to leave a special tendency to the production of tubercular disease. Other sequelæ are diarrhœa, ophthalmia, otorrhœa, and abscesses in the ear; inflammation, followed by suppuration of the parotid, cervical, and submaxillary glands; whooping-cough, stomatitis, and gangrene of the mouth.

Pathology.—Post-mortem examination reveals little beyond inflammatory conditions of the internal organs, especially of the lungs and air-passages.

Treatment.—The patient should be kept in bed in a warm and well-ventilated room free from draughts. The diet should at first be low, consisting of gruel, milk and water, and beef-tea.

The evacuations should be passed into vessels containing carbolic acid, or some other disinfectant. The cough may be relieved by mild sedatives, and the febrile symptoms by diaphoretics and refrigerants. In fact, the main object is to make the patient as comfortable as possible. The body may be sponged from time to time, and complications encountered as they arise by appropriate remedies.

Convalescence will demand sea air, cod-liver oil, and tonics.

Rötheln—Rubeola Notha—German Measles.

This disease partakes somewhat of the nature of both measles and scarlatina, but it is distinguished from either,

especially by the fact that an attack of Rötheln confers no immunity from a subsequent attack of either measles or scarlatina. On the contrary, an attack of Rötheln has followed immediately upon genuine scarlatina or measles.

The leading characters of this disease are the following:

The prodromata are very ill-defined. The rash, although at first very similar to measles, is of very short duration, and seldom lasts for two days. The desquamation is very partial and incomplete, and catarrhal symptoms slight or absent. The temperature seldom exceeds 100° Fahr. The constitutional disturbance is never so great as in measles or scarlatina. The tongue is only slightly furred, and never presents the "strawberry" appearance. After its first appearance the rash may be very similar to that of scarlatina, but it is almost always more confined to patches. The colour of the eruption is something between the lake-like colour of measles and the crimson of scarlet fever. It is somewhat raised, and the shape of the patches is very irregular. The affection is contagious, but infinitely less so than scarlatina.

Very simple treatment is requisite, and there are seldom any complications or sequelæ.

Scarlatina—Scarlet Fever.

Definition.—An infectious and contagious fever, accompanied by sore-throat, a peculiar scarlet rash, and terminated by desquamation of the skin.

Varieties:

1. Scarlatina simplex, or mitis.
2. Scarlatina anginosa, or severa.
3. Scarlatina maligna.
4. Scarlatina sine eruptione.

Causes.—Predisposing.—Infancy and childhood; no age can, however, be said to be exempt.

Exciting.—Specific contagion or infection, conveyed by contact and by fomites.

Preceding Symptoms.—The preliminary symptoms are those of general fever accompanied by inflammation and soreness of the throat; and in proportion to the severity of the throat affection so is the intensity and danger of the fever. A child may die of the throat affection, although it has never complained of its throat, and therefore, in all cases, the throat should be examined.

Chill and vomiting often precede; and in children diarrhœa, epistaxis, and convulsions are not uncommon.

Period of Incubation.—About four to six days.

Day of Appearance of the Rash.—Usually the second day.

Character of the Rash.—A number of minute papules, constituting patches of large size, or a general efflorescence of a vivid scarlet colour (compared to a boiled lobster) appearing in general, first upon the face and neck, and extending over the whole body in twenty-four or thirty-six hours.

The eruption generally declines about the fourth or fifth day after its appearance, and is followed by *copious white desquamation* of the skin (especially the skin of the hands and feet, the nails being often shed).

The temperature rarely exceeds 105° Fahr., but it may be as high on the first day of the eruption. The pulse may be 130—170.

The tongue is at first coated, but afterwards becomes clean and raw-looking, presenting either the papillæ on a white base (the white strawberry), or white papillæ on a red base (the red strawberry). The duration of an ordinary case is about a fortnight.

In Scarlatina Simplex, Mitis, or Mild, the throat is simply inflamed, not ulcerated, and the fever is moderate.

In Scarlatina Anginosa or Severa, the throat is greatly

inflamed, the tonsils sometimes exhibiting small ulcerative patches; the temperature is high, and the pulse rapid and full. The cervical glands and cellular tissue may be so swollen as to form the so-called "collar of brawn" from ear to ear. The fauces and pharynx may ulcerate and slough, and posterior pharyngeal abscess may form. The inflammation frequently extends through the Eustachian tube, purulent discharge from the ear resulting.

In SCARLATINA MALIGNA, the eruption may be scarcely visible, the pulse feeble, rapid, and irregular; the tongue brown, the throat apt to slough, the cervical glands to enlarge and suppurate, and the danger to life is very great. The tonsils may be the seat of sloughing ulcers, leaving ragged sores. There is delirium, with excitement and extreme exhaustion. The attack may prove fatal within forty-eight hours of its appearance.

SCARLATINA SINE ERUPTIONE, or without rash, may be described as a form of scarlatina in which the throat symptoms and the fever are present, but in which the rash is so ill-defined as to be unrecognisable.

Many cases have been observed at the Children's Hospital, Hackney, in which no scarlatinal symptoms had been noticed previously, but the children were actually at the time desquamating.

Complications.—Bronchitis, pneumonia, acute rheumatism, and endocarditis. Acute desquamative nephritis may result between the 18th and 21st day of the illness, followed by dropsical effusions, as anasarca, ascites, hydrothorax, or hydropericardium; the kidney affection is more likely to be developed in the mild cases, since the patients are less careful, and therefore the risk of exposure to cold is greater.

Sequelæ.—These are more likely to occur after the anginose and malignant forms. They are the following:

Swellings and *pain* in the larger joints, scrofulous affec-

tions, rhinorrhœa, otorrhœa, and deafness, suppuration of the cervical glands, ulcers of the tongue, pharynx or epiglottis, diphtheria, ophthalmia, inflammations of internal viscera or their peritoneal coverings, mortification of face, lower extremities, and of the pudenda in females.

Vaginitis, with muco-purulent discharge from the vagina, is not uncommon in female children; and it is highly important to recognise its origin, since it not unfrequently gives rise to unfounded suspicions.

Treatment.—This should be much the same as in measles.

Free ventilation should be insured, and cooling drinks and light nourishment given.

The tepid bath and sponging will be advantageous.

The *wet sheet* is held in high esteem. The sheet is wetted with water at a temperature of 70° Fahr. The patient, having been stripped, is enveloped in the sheet, and covered closely with several blankets. Internally, a mixture of sulphuric acid, with syrup of poppies, or small doses of quinine, with the acid infusion of roses, may be administered.

For the relief of the throat symptoms, in severe cases, chlorate of potash may be given, both as a gargle and internally.

Malignant cases will require stimulation by alcohol, ether, or carbonate of ammonia. Antiseptic gargles may be applied to the throat, as solutions of chlorinated soda, or of permanganate of potash, and the sulphuric acid spray.

During convalescence, cod-liver oil and tonics, especially the ferruginous, will be of service.

Measles contrasted with Scarlet Fever.

In *Measles* the rash appears on the fourth day of the illness; the eruption is of a brownish-red colour, and arranged crescentically (shrimp's tail), being followed by slight branny desquamation of the skin. The accompanying

symptoms are coryza and cough, and the fever is generally moderate.

In *Scarlatina* the rash appears on the second day; the eruption is of a vivid red or crimson colour (boiled lobster), and is succeeded by copious white desquamation of the skin. The accompanying symptoms are, sore throat and the strawberry tongue, and the fever is generally considerable.

CHAPTER XXXVII.

THE ERUPTIVE FEVERS (Continued).

Vaccinia—Cow Pox.

Vaccination.

The Operation of Vaccination.—There are three methods of performing this operation, viz.: (1) *Puncturing;* (2) *Cross Scratching;* (3) *Tattooing.*

1. *Puncture.*—Three or four punctures should be made near each other in either arm, or in both arms, near the insertion of the deltoid muscle.

The skin should be made tense, and a sharp lancet inserted obliquely downwards at an angle of 45° into the true skin, so as to draw a trace of blood. The operation is not invalidated by bleeding, but it is not desirable to make too deep an incision; care must be taken that the lancet is quite clean and free from grease, in order that the vaccine lymph may cling to it.

2. *Cross Scratching.*—The cuticle should be abraded by a number of cross scratches down to the cutis. Three scratches will suffice if they are of fair size.

3. *Tattooing.*—Numerous small superficial punctures should be made with a fine pointed lancet, and the lymph subsequently spread over these with the flat part of the lancet.

If the lymph be taken from the arm of a child, the lancet must be first dipped into it, and then inserted into the punctures. When preserved on points, or slips of glass, the lymph should be first rendered moist by breathing on it, or by rubbing it with a drop or two of water or glycerine.

The Areola.—When successfully performed, the eruption usually takes the following course:

2nd Day.—Small spots, feeling hard, but under the microscope appearing vesicular.

3rd and 4th Days.—The spots larger and more evident.

5th Day.—Small clusters of pearly oval or circular vesicles corresponding to the punctures, and containing a very small quantity of transparent liquid.

8th Day.—The vesicle is perfect, and of its full size, the surface being depressed, and its margin elevated. In the evening of this day the network of vesicles becomes surrounded by a circular rose-coloured areola, the skin being painful and tense for some distance around it: some slight feverishness now usually sets in.

9th and 10th Days.—The areola enlarges, and may be accompanied by extensive erythema of the arm, and occasionally, though rarely, by a lichenous rash spreading over the whole body.

11th Day.—The cluster of vesicles now, if it has not been opened, has burst; the areola begins to fade. The centre of the vesicles is coated by a brown scab, which falls off about the twentieth day, leaving a deep indentation on the skin of a circular shape, presenting as many pits as the cluster contained vesicles.

If the above appearances are not presented, re-vaccination is necessary, since the vaccine disease has not been properly communicated.

Time for taking the Lymph.—From the fifth to the eighth day; it cannot be relied upon after this time.

Circumstances preventing proper Communication.—Any chronic eruption on the arm; scarlatina, measles, or other skin disease; disordered bowels; the progress of the vesicle having been disturbed by friction or by injury.

The vaccine disease in children may occasionally be followed by boils, pustules, and some skin eruptions, but in these cases it is probable the child's health was bad at the time of the operation.

Infants may be vaccinated any time after the 6th week, but the age of three months is preferable.

Vaccination should be repeated every seven years, until about the middle period of life. It is considered unnecessary so long as three well-marked excavated scars are present, but in epidemics of small-pox this rule must be disregarded.

If the vaccine lymph be properly inserted, to a certain extent immunity is conferred from small-pox, and should this disease occur, it is greatly mitigated. During severe epidemics, when the contagion is at the height of its power, the protection is less effectual.

VARIOLA—SMALL-POX.

Definition.—An infectious and contagious disease, ushered in with febrile symptoms, and succeeded by an eruption passing successively through various forms of skin disease—viz., first *papulæ*, then *vesiculæ*, and finally *pustulæ* in about eight days.

Varieties:

1. Variola Discreta (Discreet).
2. Variola Confluens (Confluent).
3. Variola Semi-confluens (Semi-confluent).
4. Variola Nigra, Maligna, vel Hæmorrhagica (Black, Malignant, or Hæmorrhagic).

Causes.—A specific poison emanating from individuals

suffering from the disease, or conveyed by fomites, or communicated by inoculation of the variolous matter.

Preceding Symptoms.—These are: Rigors, usually more marked than in other eruptive fevers; headache, nausea, and vomiting; in older children, severe pain in the back and epigastrium; in young children, however, little complaint is made of the pain in the back. There are also general feverish symptoms, biliousness, thirst, heat of skin; full, frequent pulse (120 to 160); furred tongue, generally constipation, but occasionally, though rarely, diarrhœa (a formidable indication); convulsions, and occasionally delirium. The temperature may rise as high as 106° Fahr., but may sink to 100° Fahr., when the eruption appears.

Period of Incubation.—About ten to sixteen days.

Day of Appearance of the Rash.—About the third day.

Pain.—According to the severity of the attack, and the age of the child.

Character of the Rash.—The eruption appears first on the face, neck, and wrists as a number of *papules* slightly elevated above the skin, and feeling like small shot under the fingers (occupying from one to three days in diffusing over the whole body). About the fifth day these papules become *vesicles*, which are *umbilicated—i.e.*, depressed in the centre—and surrounded by an inflamed areola. About the seventh or eighth day the vesicles become *pustules*.

About the eighth or ninth day matter begins to ooze from the edges of the pustules, and a decided increase of fever sets in (secondary fever), accompanied by a fresh rise of temperature.

This is the *Suppurative Stage*, or stage of *Maturation*, at which period the danger to life is the greatest.

With the general maturation of the eruption the scalp becomes puffy, and the face swollen. There is great tingling

and itching of the skin, which emits the peculiar odour characterising the disease.

About the fourteenth or fifteenth day scabs form and fall off, leaving pits in their places. Simultaneously with the eruption, deposit of lymph may occur upon the throat, tongue, and soft palate, forming round whitish or ashy spots, which are characteristic of the eruption on a mucous surface, and may be followed by inflammation and ulceration of those parts.

Although it is usual to describe the variolous eruption as passing through the three forms above mentioned, it must be understood that the actual forms of skin disease represented are in the following order, viz.: *maculæ* (spots), *papulæ* (pimples), *vesiculæ* (vesicles), *pustulæ* (pustules), and in the confluent form *bullæ* (blisters).

Variola Discreta is the term applied to the disease when the spots are separate.

Variola Confluens, when the spots run together. In this form diffused redness of surface usually precedes the appearance of the papules and vesicles. It is a far more severe form than the discrete, the primary and secondary fevers being both more intense.

Variola Semi-Confluens is a form in which the coalescence of the spots takes place to a greater or less extent, but not over the whole or greater part of the body.

Variola Nigra, Maligna, or Hæmorrhagica, is characterised by great prostration, accompanied by delirium passing into coma, and preceded by hæmorrhages from the bowels, kidneys, or uterus; the eruption being dark or even purple in colour. In some cases life may be destroyed before the appearance of the symptoms.

Complications and Sequelæ.—These may be pharyngitis, laryngitis, œdema of the glottis, and bronchitis. Pneumonia, pleurisy, and pericarditis are apt to occur during the course

of the disease. Boils and abscesses are frequent sequelæ. Ophthalmitis, leading to blindness, and internal otitis, terminating in deafness, have been observed. Hæmorrhage may occur in different situations, giving rise to hæmaturia, epistaxis, and menorrhagia.

The mortality is very great in the confluent cases, but much less so in the discrete forms. Death sometimes takes place before the eruption is matured, from the severity of the small-pox virus.

Death may result from the intensity of the brain and throat symptoms, or from drainage of the system by the excessive amount of the purulent eruption, or from exhausting diarrhœa. In fatal cases, death usually takes place from the eighth to the thirteenth day.

In infancy, 50 per cent. of the cases under five years of age die; in children from nine to fifteen years of age the prognosis is usually favourable.

Pathology.—In variola there is an inflammation of the papillæ of the skin. An exudation takes place from the papillæ into the rete mucosum, by which means the layers of the latter become separated. After suppuration, if the rete mucosum is alone affected, no scar results; but when the papillæ become so infiltrated by newly formed cells that their bloodvessels are compressed, then sloughing takes place, the dead parts are thrown off, and after healing occurs scars remain.

Treatment.—This embraces both general and local measures.

The general treatment is the same as for the continued fevers. During the invasion the intensity of the fever may be diminished by the use of cold drinks—iced water, carbonated water, lemonade—by refrigerants, and cold or tepid sponging of the body. Remedies may be given to relieve nausae and vomiting, and other symptoms, as they arise.

During the suppurative stage alimentation and supporting measures are very important.

The local treatment consists in preventing the occurrence of pitting of the skin, and is termed *Ectrotic*, signifying causing to miscarry. The measures employed are the following:

1. Evacuation of the vesicles by a fine needle.

2. Evacuation of the vesicles and cauterisation by a fine point of nitrate of silver.

3. Application of tincture of iodine, by means of a brush, during the papular state of the eruption.

4. Exclusion of air and light by a plaster of some kind.

5. Application of prepared chalk and subnitrate of bismuth in equal parts, often smearing the surface with sweet oil.

6. Olive oil and carbolic acid (1 in 40) are employed.

7. Pork lard melted and freely applied.

8. Touching the apices of the pustules with pure carbolic acid, combined with oil of wild thyme to disguise the odour of the acid.

Varioloid Disease—Modified Small-Pox.

By this term is implied an attack of small-pox modified by vaccination. This operation, even when properly performed, does not always ensure protection against small-pox, but usually modifies the disease materially. The primary fever is generally slight, and lasts only for three or four days.

The eruption is usually much less abundant; in fact, in some cases the eruption may be limited to a single pock, the course of the eruption may be shortened, and maturation may be completed in five or six days. Constantly the

eruption aborts to a greater or less extent. It may be arrested at the vesicular, or even the papular period.

The secondary fever and its perils are very considerably diminished, as well as the disfigurement of the skin. Even when the eruption becomes pustular, the course of the disease is more rapid, the pustule drying up on the sixth or seventh day. The pustules are usually small, and are not umbilicated; there is either no pitting, or this is very slight.

The treatment is the same as that of small-pox, but seldom any except hygienic measures are necessary.

Varicella—Chicken Pox.

Definition.—An infectious and contagious disease, generally ushered in by slight fever symptoms, and succeeded by an eruption, which usually runs its course in about five days.

Symptoms.—Varicella is a mild and insignificant affection, as regards distressing symptoms and danger. As a rule, it it is only observed in children, although it is occasionally seen in adults. A second attack is never met with.

Period of Incubation.—About four to fifteen days.

Preceding Symptoms.—Slight fever, headache, and cough.

Day of Appearance of the Rash.—On the first or second day of the illness.

Varieties:

1. Varicella lentiformis, or lenticularis, in which the vesicles are about the size of split peas, and flattened at their tops.

2. Varicella coniformis, or conoïdes, or swine-pox, in which the vesicles are of a conoidal form.

3. Varicella globularis, or globata; the vesicles unusually large and globular.

At first there are only a few spots, but fresh crops appear in considerable numbers during four or five nights, beginning as bright red spots, which in a few hours become vesicular, clear fluid collecting under the epidermis. There is no inflammatory areola or umbilication. The vesicles dry up from the third to the fifth day. The disease is not usually followed by discolouration or pitting of the skin, but occasionally distinct pits, round, smooth, and shining, are observed. There may be considerable itching, and sometimes a peculiar faint smell attends the eruption.

The *Treatment* must consist in keeping the patient in doors, administering mild diet, and keeping the bowels moderately open. Children should be prevented from scratching. If catarrh should be present, measures must be directed to this complication. During convalescence quinine may be given.

Varioloid Disease contrasted with Varicella.

The stage of invasion in varioloid disease is of somewhat longer duration than in varicella.

The shortness of this stage in varicella is characteristic.

The constitutional symptoms in varioloid are often marked.

In varicella these symptoms are remarkable for their mildness.

In varioloid the vesicles are preceded by papules.

In varicella there is a characteristic *vesicular* appearance of the eruption from the commencement.

In varioloid the eruption appears especially on the face.

In varicella the eruption is observed first on the body, and is usually more abundant elsewhere than on the face; umbilication of the vesicles is generally to be found in more or

less of the varioloid vesicles. In varicella this condition is absent.

In varioloid disease the duration of the eruptive stage is greater, as a rule, than in varicella.

CHAPTER XXXVIII.

DISEASES OF THE SKIN.

The Parasitic Skin Diseases.

The parasites which attack the skin are of two kinds: (1) Vegetable and (2) Animal.

THE VEGETABLE PARASITES.

The following are the diseases due to the presence of a vegetable parasite in the skin, viz.:

1. Tinea Favosa, or Favus. } Achorion Schœnleinii.
2. Tinea Trichophytina. { Tinea Tonsurans, or Ringworm of the scalp; and Tinea Circinata, or Ringworm of the body. } Trichophyton.
3. Tinea Decalvans, Porrigo Decalvans, or Alopecia Areata. } Microsporon Audouini.
4. Tinea Versicolor, or Chloasma. } Microsporon Furfur.

There is great doubt as to the parasitic nature of Tinea Decalvans.

1. *Achorion Schœnleinii.*—Consists of a number of vegetable cells or spores mixed with a quantity of granular matter. The spores are round or oval, $\frac{1}{3000}$th of an inch in diameter, have a slight constriction in their centre, and are mixed with a number of branched tubes, some filled with granular matter and some empty, and which vary from $\frac{1}{4000}$th to $\frac{1}{5000}$th of an inch in diameter. This parasite is seen in the substance of the hair itself.

2. *Trichophyton.*—Differs chiefly from the above parasite in the fact of the number of its tubes being smaller, and the quantity of its spores greater. The spores are round or oval, and are about $\frac{1}{7000}$th of an inch in diameter, sometimes united in the form of chains, but for the most part isolated.

3. *Microsporon Furfur.*—In this parasite the spores are of large size, collected in clusters like bunches of grapes mixed with numerous branched tubes.

Tinea Favosa, Favus.—The part affected exhibits numerous dry, circular, cup-shaped, yellow crusts, with a central depression somewhat resembling a honeycomb, or an irregular mass of dry yellow crust. In the centre of each cup or depression is a hair. The hairs are dry-looking and dull, can be readily pulled out, and show under the microscope the *Achorion Schœnleinii.* There is some amount of itching, and a peculiar very offensive mouse-like mouldy smell may be observed. The affection begins in the form of small yellow specks enveloping the roots of the hair. If not arrested the hair-follicles are destroyed, and patches of baldness appear. It is contagious, and appears about the age of seven years. Not only the scalp may be attacked, but also the eyebrows, forehead, and chin, and occasionally even the extremities and trunk.

The chief varieties are :

Favus Pilaris.—Chiefly affecting the hair.

Favus Epidermidis.—Attacking other parts of the skin.

Favus Unguium.—Attacking the nails.

Tinea Tonsurans, Porrigo Scutulata, or Ringworm. —This affection exhibits itself in the form of circular patches on the scalp, varying in size from a sixpence to that of half-a-crown, from which the dry dull hair has been broken off, so that it projects only slightly above the surface, this being covered by fine white powdery scales. The hairs are very brittle, and possessed of no elasticity. There is usually some itching at the beginning of the eruption. It is usually confined to childhood. Under the microscope, the scurf and hair show the *Trichophyton.* This affection is chronic and contagious.

Varieties.—The chief are the following :

Tinea Tonsurans.—Ringworm of the scalp.

Tinea Circinata, or Herpes Circinatus.—Ringworm of the extremities or trunk.

Tinea Decalvans, Alopecia Areata or Porrigo Decalvans.—In this affection are seen oval or round patches of baldness, the hair being entirely removed, or replaced by fine downy hairs. The skin is quite white, and there is little or no irritation. The skin is at first somewhat reddened and wrinkled. The affection is generally confined to the scalp, but may be seen in the eyebrows and genitals. Some authorities consider the affection traceable to a vegetable parasite, *Microsporon Audouini ;* but this is doubted by others, who attribute it to a diseased condition of the nervous system.

Tinea Versicolor, Chloasma, Pityriasis Versicolor, or Liver Spot, is not very common in children. It generally appears on the front of the chest and abdomen. The affected parts are covered by an increased formation of fine epidermal

scales, which are being continually rubbed off in the form of a fine powder; the eruption is of a yellow brown colour, and presents irregular patches, and in the scales are found the *Microsporon Furfur*. It is seldom accompanied by itching, and is especially prone to occur in those children who perspire very freely.

Treatment.—The general treatment in tinea of all forms is to observe great cleanliness and good conditions of hygiene, to administer nourishing food, syrups of the iodide and phosphate of iron, and cod-liver oil. The local treatment should consist in poultices, to remove scabs; to shave the head, or to cut the hair very close with sharp scissors, and well wash the head, subsequently applying some parasiticide, such as sulphurous acid, lotio carbonis detergens, corrosive sublimate or strong tincture of iodine. The iodide of sulphur ointment is often very useful. Strong nitrate of silver is occasionally necessary, and the hyposulphite of soda lotion (sixty grains to an ounce of water) is held in much repute by some authorities.

THE ANIMAL PARASITES.

A. PEDICULI, OR LICE.—Of these there are three varieties, viz.:

1. Pediculus Capitis (of the head).
2. Pediculus Pubis (of the pubes), and
3. Pediculus Corporis (of the body).

The Pediculus Capitis is frequently associated with head eruptions in children. The eggs, or *nits*, bite into the skin, producing a pustular eruption, accompanied by intolerable itching.

The condition produced by lice is termed *Phtheiriasis*, or *Lousiness*.

Treatment.—This is always satisfactory, and should con-

sist in extreme cleanliness, and in rubbing into the skin the mercurial or white precipitate ointment.

B. Acarus Scabiei, or the Itch Insect.—This is the cause of the disease known as the itch. Cuniculi, or furrows, may be found in the skin, formed by these insects. At the extremity of each furrow a minute whitish elevation may be detected, which is in reality a thin epidermal layer covering the insect itself. By lifting this layer with a penknife the acarus and its ova may be obtained.

When full grown, the acarus has eight legs, attached to a round body, and has a projecting head. The female is larger than the male, and varies from $\frac{1}{7}$th to $\frac{1}{4}$th of a line in length. The eggs are about $\frac{1}{2\frac{1}{5}}$th of a line broad, and $\frac{1}{11}$th of a line long.

The eruption consists of vesicles intermixed with papules, and sometimes with pustules. It is generally found upon those situations in which the skin is thin, and is accompanied by intense itching, which is aggravated when the body is warm. The chief seats of scabies are the spaces between the fingers, the inner sides of the wrists, or thighs.

Treatment.—This should consist in placing the child in a sulphur bath, subsequently rubbing into the skin sulphur ointment, or an ointment of carbonate of potash and sulphur, or olive oil and sulphide of calcium.

The sulphur ointment should be rubbed in for a few nights in succession, and then washed off in a warm bath. The clothes should be subjected to the fumes of sulphurous acid gas, or they should be destroyed.

CHAPTER XXXIX.

THE SKIN DISEASES PROPER.

EXANTHEMATA—RASHES.

ERYTHEMA.—ROSEOLA.—URTICARIA.—ERYSIPELAS.

Definition.—Exanthemata, or rashes, consist of red patches, superficial, of various sizes, diffused or circumscribed, which disappear on pressure and terminate in resolution and desquamation.

ERYTHEMA.

The skin presents patches of a red colour, which disappear on pressure. The parts are sometimes slightly raised, and there are heat and itching, fever is usually absent, and the affection is non-contagious.

Varieties: Erythema Fugax; Erythema Intertrigo; Erythema Nodosum.

In *Erythema Fugax,* the patches appear and disappear suddenly.

Erythema Intertrigo is common in the rheumatic diathesis. It is characterised by large, somewhat elevated irregular red patches, which disappear on pressure. Its origin may be local, being produced by the friction of adjacent parts, two folds of skin rubbing against each other, as in the loins, neck, axillæ, anus, clefts of the nates, and the inside of the thighs.

Erythema Nodosum consists of raised, red, oval patches, about $\frac{3}{4}$ths of an inch in width, and from 1 to 2 inches in length, never occurring on the body, but chiefly over the shin-bones and arms. Each patch may last from four to ten days, fresh patches continuing to appear. The affection

may last for three or four weeks ; it is generally preceded by slight feverishness. This variety of Erythema sometimes accompanies rheumatism and chorea, and is especially common in young girls.

Treatment.—Erythema fugax usually speedily disappears of itself or yields to mild aperients, the warm bath, and spirit lotions.

Erythema intertrigo may require lotio carbonis detergens, or, after washing without soap, the application of some soothing dusting powder, such as powdered camphor, oxide of zinc, and starch, in the proportion of 1, 8, 16.

Erythema nodosum is best treated by alteratives and tonics, as bark and quinine.

Greasy applications generally do more harm than good in all varieties of erythema.

CHILBLAINS.

A chilblain may be defined as a localised erythema of the skin. The parts chiefly affected by chilblains are the feet and hands, the nose, and the lobes of the ears. Chilblains are common in children during the winter season. Cold first produces an amount of numbness and insensibility in the part affected, with stiffness of motion and more or less pallor. After the establishment of reaction, tingling and itching are felt in the part, which rapidly becomes hot, swollen, and red. The limit of the inflammation is marked by an abrupt line. After a few days' continuance the redness is replaced by a livid blue appearance due to congestion.

Three degrees of severity are described :

1. The Erythematous chilblain.
2. The Vesicated chilblain.
3. The Gangrenous chilblain.

1. The *Erythematous chilblain* has just been described.

2. The *Vesicated* or so-called broken chilblain may follow the erythematous variety, or result from a greater degree of cold. This chilblain is of a dusky purple tint, and the swelling, itching, and congestion are more intense. Elevation of the cuticle takes place by the effusion of serum, a vesicle being formed; after the bursting of the vesicle, the surface below is grey or livid, showing an ulcerated or sloughing surface. These chilblains are very painful, and may last all through the winter.

3. The *Gangrenous chilblain.* Here the surface of the skin is destroyed, and gangrene results, with the separation of the slough. The constitutional symptoms are sometimes very severe, the strength being greatly prostrated, and it is stated that the brain is specially liable to be affected, and that the disease may end fatally.

Treatment.—For the treatment of the erythematous chilblain, a liniment of camphor or of ammonia, etc., may be employed; or a liniment of soap liniment and tincture of cantharides, or some creasote ointment. The parts affected may be painted with nitrate of silver (10 or 20 grains to the ounce of distilled water) morning and evening. They should be kept warm and protected from the air.

The vesicated and gangrenous forms should be treated according as they are inflamed or indolent. In the former case, water dressing or lead lotion will be serviceable. In the latter case, benzoated zinc ointment or resin ointment with spirits of turpentine must be employed, and tonics should be given, wine, etc.

ROSEOLA

Is characterised by an eruption of irregularly shaped patches of a red-rose colour, slightly if at all elevated. It is

accompanied by tingling and itching, and sometimes by slight fever. The rash may affect the whole body, or be limited to some parts.

Varieties.—Roseola Infantilis; Roseola Æstiva; Roseola Autumnalis; Roseola Annulata.

The affection is termed *Infantilis* when occurring in infants, *Æstiva* occurring in the summer, *Autumnalis* when occurring in the autumn.

When roseola accompanies the premonitory fever of small-pox, it is called *Roseola Variolosa;* when it follows vaccination, it is termed *Roseola Vaccina.* It sometimes resembles scarlatina, at other times measles; but the spots are not raised as in the latter, and it is usually confined to the trunk of the body or to one limb. The bright scarlet colour of scarlatina is wanting.

Roseola Annulata is a form in which the eruption presents red *rings* with healthy skin intervening.

Roseola may be caused by gastric disturbance, especially in hot weather, by drinking cold water when the body is heated, or it may accompany dentition.

Treatment.—Laxatives, tonics, or alteratives will be demanded, according to the condition of the system at the time of the roseoloid eruption.

URTICARIA—NETTLERASH.

This affection of the skin acquires its name from presenting an appearance similar to that caused by the sting of a common nettle. It presents round or oval prominent elongated patches of skin, of a pale-red or dusky colour, which appear and disappear suddenly, are attended by intense itching and heat, and may often be excited by scratching. Urticaria is frequently caused by indigestion, being attended by nausea and vomiting. It may originate in the sting of an insect

or flea, or follow mental emotion, fear, anger. It is often caused by particular articles of diet, as shell-fish, lobster, pork, mushrooms, etc. It has been stated to be produced by the presence of intestinal worms.

Treatment.—If due to irritating food, an emetic should be given, followed by a mild aperient. Chronic cases should be treated by warm or vapour, sulphur or alkaline baths, and with alteratives, aperients, and strictly regulated diet. Liquor arsenicalis may be employed, and the smarting will derive much benefit from lotions of acetate of lead, prussic acid, and perchloride of mercury.

ERYSIPELAS.

The infantile form of erysipelas, or that which takes place in children under six months old, usually originates at the navel. It may occasionally result from intertrigo, but very rarely follows vaccination. Like the adult form, this affection exhibits swelling, redness, pain, and heat. The redness may become livid, and may be followed by the formation of vesicles, or even the part may become gangrenous. It is exceedingly dangerous, and may end fatally within seven days. The duration is usually from two or three weeks. *Infantile* erysipelas shows a marked tendency to creep insidiously from surface to surface, until frequently the whole body is attacked.

Erysipelas in children is happily a rare complaint. It is chiefly liable to appear during an epidemic of puerperal fever. The navel under such circumstances heals indolently, and umbilical phlebitis is the exciting cause of the affection.

Treatment.—This is very unsatisfactory. It is stated that all new-born infants so affected die, and that even up to a fortnight recovery is very rare. Bathing with some warm

mucilaginous fluid will be a useful proceeding, starch or flour being dusted over the erysipelatous surface in the intervals. The sound skin around the part affected may be pencilled with nitrate of silver. If fœtor and sloughing be present, a lotion of carbolic acid with glycerine may be used; two minims of Tinctura Ferri Perchloridi may be given in sweetened water every two hours. If there be much prostration, a few drops of brandy may be given.

CHAPTER XL.

Papulæ—Pimples.

LICHEN.—STROPHULUS.—PRURIGO.

Definition.—Papulæ, or pimples, are small, firm, pointed elevations of the skin, generally ending in scurf, and rarely ulcerating at their summits.

LICHEN

Is characterised by a number of minute pimples, usually of a red colour, sometimes grouped together, at other times separate, accompanied by itching or tingling. The papules at last desquamate, and the eruption disappears. The parts in which the skin is thickest are generally affected—viz., the exterior of the leg and thigh, the back of the hands, and the forearm. The affection may commence with slight fever, and disappear in a week or ten days; but its course is often more chronic. It is not contagious.

Varieties.—Lichen Simplex; Lichen Agrius; Lichen Urticatus.

In *Lichen Simplex* the papules are bright red, and of the size of a millet-seed.

In *Lichen Agrius* the papules run together, and are situated on an inflamed base. There is considerable constitutional disturbance, and the pain and smarting are intense. After a time the papules burst, with the exudation of sero-purulent fluid, and the formation of painful cracks. This variety of lichen may last for several months, but it is not a common affection in children.

In *Lichen Urticatus* the papules are large, prominent, and inflamed, resembling the bite of a bug or gnat, or the sting of a nettle. The surface is liable to bleed if there be much scratching. This variety appears to be peculiar to children, and is notable for its obstinate character.

STROPHULUS—RED GUM.

This is very common in infants from birth to the first dentition. It is really a variety of lichen, and is sometimes termed *Lichen Strophulus.* It presents many varieties, according to the arrangement of the papules and the colour of the skin. It usually lasts for three or four weeks, and affects the face, neck, and hands. It sometimes depends upon dentition or digestive disturbances.

Treatment.—In all varieties of lichen, careful attention must be paid to the diet and to the condition of the bowels. The child should be clad warmly, and placed in a warm bath daily. The severe itching may be relieved by baths, lotions, and sedative ointments. A wash of carbonate of potash may be employed, and ointments of iodine and periodide of mercury (100 grains to 1 ounce of lard), and iodine and sulphur vapour. Great cleanliness is necessary. In

severe cases, which are not common in children), low diet, brisk purgatives, and liquor arsenicalis may be required.

PRURIGO.

This affection presents papules of the same colour as the surrounding skin; they are larger than those of lichen, and very chronic in their duration. The itching is very severe, and is intensified by warmth. Prurigo is generally seen upon the neck and shoulders, but it may occur upon the extensor surface of the limbs. A small speck of dark blood is usually seen upon the summit of the spots produced by the scratching. It is not a common affection in children. At the commencement of the complaint very few papules may be present, and at that period the itching is the chief symptom. Some authors are of opinion that prurigo is always caused by the presence of pediculi or lice.

Treatment.—All sources of irritation must be removed from the skin, such as pediculi or flannel under-garments; great cleanliness must be observed, and alkaline or tar baths may be given. Internally, cod-liver oil, iron, and arsenic are indicated. When lice are the cause, the best remedy is carbolic oil (1-8) or carbolic lotion (1-20). The clothing should be exposed to a dry heat at the temperature of 250° Fahr.

CHAPTER XLI.

SQUAMÆ—SCALES.

PSORIASIS.—PITYRIASIS.—ICTHYOSIS.

Definition.—Squamæ, or scales, are opaque hard layers of cuticle surmounting papules or inflamed surfaces, and continually being detached or renewed.

PSORIASIS—DRY TETTER.

The skin presents elevated patches of white dry epidermis. The cutis below is slightly raised, of a red colour, and somewhat thickened. To those cases in which the eruption has assumed a circular or oval form the term *Lepra* was at one time applied, but it is seldom employed in the present day.

This affection is not common before five years of age. It is recognised by small white spots, increasing in size and running together, thus forming scaly white patches, which are merely layers of epidermis. The parts most liable to be attacked are those below the elbow and the knee-cap. When it occurs on the soles or palms, its origin is usually syphilitic. There is little or no itching. This disease is considered hereditary. It may be caused by constitutional debility, indigestion, tuberculosis, rickets, or syphilis.

Treatment.—In a mild case, warm and alkaline baths are of service. Iodide of potassium, liquor potassæ, and liquor arsenicalis are useful remedies. In the syphilitic forms, some mercurial preparation, especially the perchloride, is indicated. To allay any itching that may be present, liquor carbonis detergens well diluted, or carbolic acid (2 grains to

the ounce) with a little glycerine, will be useful. Chrysophanic acid ointment (2 drachms of the acid to 1 ounce of lard) is also recommended.

PITYRIASIS—DANDRIFF.

This is a chronic inflammation of the skin, accompanied by itching and copious desquamation of scurf or small scales. The head is the part usually attacked. Pityriasis capitis is not of unfrequent occurrence in newly born infants. There is no marked constitutional disturbance.

The part affected is covered by an increased formation of fine epidermal scales, which are continually being rubbed off in the form of a fine powder. There is no thickening of the cutis, and a considerable amount of itching is usually present. The name is derived from the bran-like nature of the scales.

Treatment.—A good application in pityriasis capitis is a lotion of borax and tincture of arnica. The head must be kept very clean, and a soft hair-brush employed. Alterative and tonic medicines, lead and alkaline lotions, lead and zinc ointments, ointment of nitrate of mercury, and sulphur baths may be employed. The itching may be relieved by lotions containing hydrocyanic acid.

PITYRIASIS VERSICOLOR

Depends upon a vegetable growth (microsporon furfur), and is characterized by a yellow-brown eruption of irregular patches, from which friction will easily remove the scales, and in which the microscope will reveal the vegetable growth. It is usually seen upon the trunk of the body, and is rarely accompanied by much itching.

ICHTHYOSIS—FISH SKIN.

The entire skin of the affected part is hard, dry, and rough, and is covered by a thick, hard, dry, nearly horny epidermis, irregularly elevated, and either raised in prominences, or exhibiting the natural cutaneous surface. Upon removing the cuticle, no redness of the skin beneath is observed; there is no pain or itching. There is generally a disagreeable smell, and the patients suffering from the disease are often cachectic. The name is derived from the similitude of the skin to that of a fish; it is often hereditary, and sometimes congenital. When local, the legs and the forearms near the elbows are chiefly affected; when general, the palms of the hands, the soles of the feet, and the axillæ are usually exempt.

Treatment.—The disease is often incurable. The vapour bath may be used, followed by the vapours of iodine and sulphur. Inunction of glycerine and water or almond oil may be employed. Internally, arsenical preparations and cod-liver oil may be exhibited.

CHAPTER XLII.

VESICULÆ—VESICLES.

ECZEMA.—HERPES.—MILIARIA.—SUDAMINA.—SCABIES.

Definition.—Vesiculæ, or vesicles, are small, rounded, pointed elevations of the cuticle, enclosing a colourless, transparent or pearly opaque lymph. After breaking and discharging their contents, they are followed by scurf, scales, or open sores. Occasionally the contents are absorbed.

ECZEMA.

The skin presents irregular-shaped patches of minute vesicles about the size of a pin's head, which on breaking discharge an alkaline fluid that stiffens linen and dries into thin yellow crusts. There are pain and smarting, or itching. It is a very common affection of the skin, is often hereditary, and is sometimes associated with gastric affections and rheumatism. It is not contagious, but in a pustular form it is inoculable.

Varieties.—Eczema has been stated to occur in the following forms, viz.: Erythematous, Vesicular, Squamous, and Pustular. The chief, however, are the following, viz.: Eczema Simplex; Eczema Rubrum; Eczema Impetiginodes.

It is also called from the part affected, viz., eczema capitis, etc.

Eczema Simplex is accompanied by moderate itching and inflammation; it may be excited by any kind of irritant, such as the sun's rays, cold, heat, scented and irritative soaps. In children the arms and face are the usual situations affected. The first appearance is that of an erythematous blush upon which minute vesicles appear, containing transparent serum. This serum becomes milky and turbid, and either becomes absorbed, the vesicles desquamating, or it is exuded, in which case thin scales and crusts form. Some smarting and itching are generally present, and the vesicles may reappear in successive crops. The duration may be from a fortnight to two or three months.

Eczema Rubrum is an inflammatory variety, and usually selects those situations in which the skin perspires most, or is thin and soft, such as the flexures of the body, the inside of the limbs, the axillæ, or the groins. In this form the crusts

are thick, the surface excoriated and inflamed, and the amount of discharge is more considerable.

Eczema Impetiginodes.—This variety occurs in debilitated or lymphatic subjects. There is a good deal of redness and heat, sero-pustules appear, serous fluid and pus exude, subsequently drying up into yellow or yellowish-brown scabs or crusts, underneath which is a red surface discharging pus. It is usually local, and exceedingly common on the heads of young children and infants. After the separation of the crusts, the surface remains reddened, but without any permanent scar. It is sometimes known as Eczema Pustulosum.

Eczema Infantile and *Eczema Capitis* are very common affections; they are often observed in young children, especially during the first dentition, and infants at the breast, and in unhealthy, scrofulous subjects. The healthiest children may, however, suffer from this complaint. There is a combination of inflammatory and pustular eczema. The Eczema infantile appears to show no natural tendency towards cure. Itching, heat, swelling, pain, and excoriation are present. By the constant scratching the pustules are torn, thin, sero-purulent fluid usually exuding, but occasionally a viscid, thicker fluid, which after matting forms crusts. The surface beneath is red, shining, and moist with sero-purulent matter.

The neighbouring lymphatic glands may swell, ulcerate, and suppurate.

"Milk Crust" is the term used when the scalp is covered by the affection.

Eczema Faciei may extend from the scalp affection and appear upon the forehead and cheeks. It is chiefly symmetrical, very irritable, but not uniform, since in one place it may be crusted, in another angry and red, in a third pustular, and in a fourth in thin lamellæ.

Eczema Tarsi attacks the edges of the eyelids, particularly in strumous subjects. On awakening in the morning the edges are agglutinated; abnormal growth of the eyelashes or eversion or inversion of the lids may follow.

Treatment.—Tingling and smarting may be alleviated by poppyhead fomentations, or by a lotion consisting of 3 grains of cyanide of potassium and 2 grains of cyanide of mercury to an ounce of distilled water. Alkaline lotions and water dressing, such as local baths of bran or poultices of potato-flour, are often serviceable. In the eczema of infants, small doses of grey-powder or calomel must be relied on, followed by small doses of liquor arsenicalis; or alterative powders, containing rhubarb, grey-powder, and bi-carbonate of soda, may be given. The scabs should be well oiled or poulticed and cleared off, the parts being then rubbed with some emollient application. Local measures should be avoided if much heat and swelling are present.

HERPES—TETTER.

This disease presents a number of large vesicles grouped together upon an inflamed base; it is attended by heat and smarting, and sometimes by severe neuralgic pain.

Herpes may commence as a red localised patch, upon which vesicles soon form. There is no starchy oozing, and no reproduction of vesicles. In some cases the eruption is followed—sometimes preceded—by severe neuralgic pains. It is usually seated over the course of a sensory nerve, such as the frontal, or one of the dorsal nerves.

Varieties.—Herpes Labialis; Herpes Zoster; and Herpes Circinatus.

The simplest form is *Herpes Labialis*, which is generally seen on the upper lip during a common cold, or during

catarrhal affections. It is unattended by constitutional disturbance, and may last two or three weeks.

Herpes Zoster, *Zona*, or *Shingles.*—This is a very common affection among children. It commences with slight feverishness, and appears in the form of a band of irregular patches encircling the body or half the body. Soon after the appearance of the red patches, they become covered by numerous close-packed vesicles, each as large as a pea, with flattened tops. The vesicles are sometimes solitary, at other times they run together, and when fully developed the previous neuralgic pains disappear, the contents of the vesicles soon become milky and thick, and after the drying up of the fluid, brownish crusts are formed, which drop off from the seventh to the twelfth day. The usual situations of zona are the thorax, the lower part of the back, and the groin. It generally follows the course of a sensitive nerve. Pain is usually present in the part before the appearance of the rash. The affection may last from one to two or three weeks.

Herpes Circinatus or *Tinea Circinata* may occur under two forms: one with large vesicles which run the usual course of Herpes; in the other form the vesicles are small, and arranged in rings rather smaller than a threepenny-piece, with a red border and a centre of sound skin; it spreads at the circumference and heals at the centre. There is no constitutional disturbance, and the disease is furfuraceous.

It may become chronic, and frequently arises in strumous children.

Treatment.—The diet should be carefully regulated, and mild aperients given. Locally, prussic acid lotion may be used, or the part may be dusted with oxide of zinc and starch, in the proportion of 1 to 3. In Herpes Zoster, when the pain is severe, morphia may be injected in the course of

the sensitive nerve. In Herpes Circinatus strong solutions of sulphate of iron or gallic acid may be applied. To prevent the disease from spreading, and for rapidly destroying all chance of contagion, hyposulphite of soda lotion (½ ounce to 1 ounce of water) or sulphurous acid lotion (1 ounce to 4 ounces of water) or unguentum hydrargyri ammoniati is very efficacious.

SUDAMINA—SWEAT SPOTS

Are transparent, colourless vesicles, resembling drops of sweat; they sometimes occur during the course of typhoid fever and rheumatism. Their contents are acid.

MILIARIA.

These vesicles are pointed, and their bases are surrounded by a red blush. They may become opalescent or purulent in appearance. Their contents are alkaline. They are considered to be inflamed Sudamina, and may appear in large numbers upon children who perspire freely and are seldom washed.

Treatment.—Frequent and complete washing and mild aperients are all that are necessary. The sweating and heat, however, may be diminished by the cautious application of cold, by mild saline aperients, and the mineral acids, especially the diluted sulphuric acid, combined with the acid infusion of roses, or with quinine or decoction of bark. The strength of the patient should be supported by ammonia and wine and good food. The skin may be washed with a weak solution of chloride of lime.

CHAPTER XLIII.

Bullæ—Blebs.

PEMPHIGUS, OR POMPHOLYX—RUPIA.

Definition.—*Bullæ*, or *Blebs*, are vesicles of large size, resembling blisters.

PEMPHIGUS, OR POMPHOLYX.

The eruption is generally preceded by sickness, headache, and malaise. It is characterised by a number of clear blisters, which vary in size from a sixpence to half-a-crown. Beneath the blisters is an inflamed patch of skin, which may form an areola around them; they attain their full size in a few days, and either burst or fade away. Some brownish scabs may remain. The trunk, face, neck, and extremities may be the seat of the disease. The affection may last from one to three weeks. If seen on the palms and soles it is generally of syphilitic origin.

Pemphigus Infantilis may arise from dentition, and gastro-intestinal disturbance.

It is a disease of some severity, and if chronic is exceedingly obstinate.

Pompholyx is considered a variety of Pemphigus unaccompanied by fever. It is rare in childhood.

Treatment.—Tonics, as quinine and iron, liquor sodæ arseniatis, 2 to 6 minims, twice a day, and cod-liver oil may be given; the blebs may be punctured and fomentations or warm poultices may be applied to the inflamed spots if there is much pain. Lotions of nitrate of silver and of weak nitric acid are useful applications.

RUPIA.

In this affection the blebs are flattened, round and isolated, about the size of a shilling, and surrounded by an inflamed areola; they are filled first with serum, afterwards with purulent or bloody fluid. Eventually each blister is surmounted by a dark-coloured, hardened scab, frequently of a conical shape, beneath which is an unhealthy ulceration, of greater or less depth. The chief seats are the shoulders, loins, and lower extremities.

Varieties.—Rupia Simplex, Rupia Escharotica, Rupia Prominens.

Rupia Simplex presents thin crusts, and is the least virulent form of the disease.

Rupia Escharotica is attended by great constitutional disturbance and extensive ulceration, frequently with sloughing—it appears usually on the legs, scalp, and genitals. These two varieties are common in children. The latter in infants up to the first dentition, at which period it is very serious; the former in children of six or seven years of age.

Rupia Prominens resembles a limpet shell; the bullæ are large, the ulcerations deep, and the crusts prominent and thick. It is usually of syphilitic origin.

Treatment.—Generous diet, wine, and tonics should be given. When non-syphilitic, liquor arsenicalis may be exhibited. In the syphilitic cases, iodide of potassium or perchloride of mercury are indicated. Locally, poultices, antiseptics, solutions of nitrate of silver, black or yellow wash, or dusting with iodoform may be employed.

CHAPTER XLIV.

PUSTULÆ—PUSTULES.

IMPETIGO—ECTHYMA.

Definition.—Pustulæ, or pustules, are circumscribed elevations of the cuticle, enclosing pus, and terminating in thick scabs or crusts.

IMPETIGO

Is characterised by an eruption of slightly raised small pustules, frequently in patches, which become matured in a day or two, then burst and discharge pus, which subsequently dries up into greenish-yellow irregular crusts. There is usually itching and heat, but no scar is left after healing. The eruption may appear upon the arms, legs, face, or scalp. Impetigo is by some writers regarded as a pustular form of the vesicular disease eczema, and a form of skin disease is not unfrequently met with in which the characters of both are presented, and which is therefore termed

IMPETIGINOUS ECZEMA, OR ECZEMA IMPETIGINODES.

This term is applied to that condition in which the vesicular stage is obscure and the pus-formation very rapid.

Varieties: 1. *Impetigo Figurata.* 2. *Impetigo Sparsa.*

Impetigo Figurata generally appears on the cheek, in the form of definite patches. It is common about the teething period.

Impetigo Sparsa is the term applied when the eruption is scattered.

Impetigo may be accompanied by or excited by pediculi.

Treatment.—This should consist in tepid baths, gentle aperients, and alteratives, and emollient applications. Itching may be relieved by prussic acid lotion, containing $\frac{1}{2}$ ounce of prussic acid and the same amount of alcohol to the 8 ounces of water. When the affection becomes chronic, alkaline lotions may be used, and the ointment of iodide of sulphur may be applied.

ECTHYMA.

The eruption consists of large round and isolated pustules, seated on an inflamed hardened base, the pus drying up into thick dark-brown scabs, which leave a purple discoloration of the skin, or in strumous children an unhealthy ulcer. Tingling, itching, and heat are frequently present.

This is generally observed upon the shoulders, back, and extremities, and is a very common disease in children. It is not contagious, but is often accompanied by scabies. Its origin is sometimes syphilitic.

Treatment.—This should comprise gentle aperients and alteratives, mineral tonics, cleanliness, emollient applications, and sea-bathing. When the disease becomes chronic, stimulating ointments, or nitrate of silver, or diluted hydrochloric or nitric acid, may be employed.

CHAPTER XLV.

TUBERCULÆ—TUBERCLES.

MOLLUSCUM.—LUPUS.

Definition.—Tuberculæ, or tubercles, are small, hard, persistent solid tumours, larger than papulæ, with or without an inflamed base, imbedded in the skin, and ending in resolution, partial suppuration, or destructive ulceration.

MOLLUSCUM.

The eruption consists of numerous hard circular tumours, which vary in size from a pea to a hazel-nut, their summits usually exhibiting a slight depression or black spot. Each tumour is occasionally attached to the skin by a pedicle. This disease often occurs in children, and may last for years.

Varieties.—The chief are the following, viz.:

Molluscum Fibrosum, Simplex, or Congenitale:

In which there are numerous tumours of various size scattered over the whole body, their surfaces dotted with black specks, and communicating a quasi-fluctuation to the fingers. They show no tendency to spontaneous cure.

Molluscum Pediculatum: in connexion with the above, or occurring independently; tumours of variable size may be met with, which consist of portions of skin hanging by slender pedicles.

Molluscum Contagiosum.—The tumours are circular, of the size of peas, presenting a marked central depression. They are most common on the exposed parts of children in

a family, and may appear on the face of the infant and breast of its nurse simultaneously. Upon cutting into and squeezing any of the small tumours a gland-like lobulated substance may be seen. In this form there is a tendency to spontaneous cure.

Treatment.—Small doses of liquor arsenicalis may be given, and the parts bathed with a lotion of sulphate of copper. The tumours may be slit up and touched freely with solid nitrate of silver, and if pediculated they should be cut off, and their bases cauterised.

LUPUS.

This disease is very rare in children, and it is usually seen on the face.

Varieties.—The chief are the following, viz.:

Lupus Erythematosus.—Irregular red patches with a glistening smooth surface, terminating in scars, but not ulcerating.

Lupus Exedens.—Leading to scars and destructive ulcerations, and attacking the nose chiefly.

Lupus Non-Exedens.—Not ulcerating, the tubercles leaving deep pits and scars, the skin seamed with white scar-like ridges.

Treatment.—Where ulceration has not taken place: friction with stimulating ointments, containing iodide of mercury, sulphur and ammonia, or tincture of iodine, or equal parts of glycerine and carbolic acid.

When ulceration has taken place: caustics must be employed, such as caustic potash, nitrate of silver, chloride of zinc and antimony, iodide and nitrate of mercury and arsenical preparations. Tonics, cod-liver oil, in combination with iodide of iron, or with vegetable bitters and acids,

should always be given ; and, with a syphilitic history, iodide of potassium must be added.

SCABIES—PSORA—THE ITCH.

This contagious disease of the skin cannot be classified under any special group, since it is characterised by the formation of papules, vesicles, or pustules. The vesicles are pointed, and present small red lines of variable length running from them. The eruption is accompanied by intense itching, and is produced partly by the presence of the itch insect, and partly by the scratching induced by the itching.

It is most common amongst the poor and in dirty persons. It appears generally in children from four to five days after exposure to the contagion. In infants it first appears on the hips and thighs, these being the parts usually most in contact with the nurse. In older children it appears usually at first on the wrists and between the fingers. The itching is increased by warmth, and sometimes the scratching causes effusions of blood, which dry into little bloody scabs resembling prurigo ; sometimes intermingled with the vesicles are pustules like impetigo, or papules like lichen.

A description of the itch insect and its cuniculi will be found on earlier pages.

In doubtful cases of scabies it is a good plan to search for the ova in the crust or thickened cuticle, in the vicinity of the vesicles. To detect these, a piece of the crust should be boiled in a solution of caustic soda ($\frac{1}{2}$ drachm to 1 ounce of water) until it is nearly dissolved. The fluid is then allowed to settle, the supernatant part is decanted, and the sediment examined, in which, if the case be one of true scabies, will usually be found the ova.

Treatment.—The child should be placed in a warm bath at bedtime, and well washed with soap and flannel; a little sulphur to the bath is a useful addition. After thorough drying, some sulphur ointment should be well rubbed in. The child should then be clad in flannel, and socks and gloves should be worn to prevent the sulphur rubbing off. This proceeding should be repeated for a few nights in succession.

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